Vol. 1081 Number 2

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

August 11, 1987

U.S.
DEPARTMENT
OF COMMERCE

Patent
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OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

Domestic PCT Fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Apr. 1, 1987 and was announced in the *Official Gazette* at 1077 O.G. 3 on Apr. 7, 1987.

International PCT fees were changed due to differences in the exchange rate and International PCT Chapter II fees effective July 1, 1987 were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

The national fees effective July 1, 1987 for entering the U.S. Patent and Trademark Office as a designated or elected Office as announced in the *Official Gazette* at 1079 O.G. 32, on June 16, 1987 are included for convenience of applicants.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed:	520.00
—Corresponding prior U.S. national application filed:	350.00
—Supplemental search fee, per additional invention	140.00
European Patent Office as Searching Authority	1180.00
Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority	370.00
—Additional examination fee, per additional invention	125.00
—Searching Authority not the USPTO	570.00
—Additional examination fee, per additional invention	190.00
International fees	
Basic fee:	485.00
Basic Supplemental fee (for each page over 30):	10.00
Designation fee for the first 10 national or regional offices:	120.00
Designation fee for 11th and subsequent designations:	No Charge
Handling fee	150.00
Supplement to the handling fee	150.00

U.S. National Stage fees

	Small Entity	Non-Small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA	170.00	340.00
USPTO was neither ISA nor IPEA	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(1) to (4)	25.00	50.00
—For each independent claim in excess of 3	17.00	34.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1	26.00	26.00

June 2, 1987.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on August 7, 1984, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,463,455 through 4,464,794
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and

(h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98–622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MAY 24, 1987, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,384,383	06/335,063	5/24/83
4,384,389	06/226,105	5/24/83
4,384,395	06/225,112	5/24/83
4,384,418	06/342,656	5/24/83
4,384,423	06/220,795	5/24/83
4,384,424	06/266,704	5/24/83
4,384,430	06/222,145	5/24/83
4,384,432	06/264,527	5/24/83
4,384,439	06/217,754	5/24/83
4,384,444	06/316,790	5/24/83
4,384,456	06/216,528	5/24/83
4,384,461	06/290,577	5/24/83
4,384,467	06/278,561	5/24/83
4,384,470	06/253,799	5/24/83
4,384,474	06/265,481	5/24/83
4,384,481	06/255,857	5/24/83
4,384,486	06/241,740	5/24/83
4,384,493	06/235,143	5/24/83
4,384,513	06/261,511	5/24/83
4,384,517	06/267,903	5/24/83
4,384,526	06/247,175	5/24/83
4,384,529	06/230,785	5/24/83
4,384,531	06/254,903	5/24/83
4,384,535	06/311,468	5/24/83
4,384,538	06/294,458	5/24/83
4,384,543	06/258,581	5/24/83
4,384,547	06/352,471	5/24/83
4,384,549	06/344,721	5/24/83
4,384,551	06/285,152	5/24/83
4,384,552	06/372,310	5/24/83
4,384,569	06/237,553	5/24/83
4,384,584	06/315,936	5/24/83
4,384,602	06/269,673	5/24/83
4,384,603	06/229,148	5/24/83
4,384,604	06/262,516	5/24/83
4,384,624	06/238,028	5/24/83
4,384,633	06/246,819	5/24/83
4,384,636	06/233,779	5/24/83
4,384,637	06/235,246	5/24/83
4,384,642	06/227,927	5/24/83
4,384,643	06/270,711	5/24/83
4,384,654	06/271,811	5/24/83
4,384,656	06/346,490	5/24/83
4,384,663	06/287,494	5/24/83
4,384,671	06/300,034	5/24/83
4,384,673	06/220,093	5/24/83
4,384,675	06/229,059	5/24/83
4,384,676	06/288,461	5/24/83
4,384,678	06/236,599	5/24/83
4,384,679	06/234,386	5/24/83
4,384,686	06/266,372	5/24/83
4,384,690	06/241,327	5/24/83
4,384,691	06/219,004	5/24/83
4,384,715	06/217,414	5/24/83
4,384,716	06/231,874	5/24/83
4,384,719	06/297,984	5/24/83
4,384,736	06/224,363	5/24/83
4,384,743	06/258,359	5/24/83
4,384,744	06/244,514	5/24/83
4,384,752	06/222,177	5/24/83
4,384,755	06/230,769	5/24/83
4,384,765	06/322,056	5/24/83
4,384,795	06/294,468	5/24/83
4,384,799	06/265,436	5/24/83
4,384,810	06/266,007	5/24/83
4,384,814	06/230,388	5/24/83
4,384,834	06/231,615	5/24/83
4,384,835	06/287,530	5/24/83
4,384,838	06/285,745	5/24/83
4,384,855	06/336,080	5/24/83
4,384,860	06/227,320	5/24/83
4,384,870	06/287,082	5/24/83
4,384,874	06/252,856	5/24/83
4,384,879	06/280,387	5/24/83
4,384,894	06/316,855	5/24/83
4,384,895	06/320,533	5/24/83
4,384,912	06/306,722	5/24/83
4,384,932	06/329,094	5/24/83
4,384,946	06/331,839	5/24/83
4,384,950	06/326,453	5/24/83
4,384,951	06/326,458	5/24/83
4,384,958	06/352,618	5/24/83
4,384,998	06/248,177	5/24/83
4,385,007	06/305,183	5/24/83
4,385,018	06/215,879	5/24/83
4,385,019	06/226,454	5/24/83
4,385,024	06/273,942	5/24/83
4,385,029	06/258,157	5/24/83
4,385,034	06/308,233	5/24/83

Patent Number	Serial Number	Issue Date
4,385,036	06/218,033	5/24/83
4,385,040	06/344,481	5/24/83
4,385,052	06/284,903	5/24/83
4,385,054	06/259,363	5/24/83
4,385,056	06/311,324	5/24/83
4,385,061	06/259,305	5/24/83
4,385,063	06/240,840	5/24/83
4,385,071	06/291,551	5/24/83
4,385,079	06/237,968	5/24/83
4,385,088	06/266,627	5/24/83
4,385,096	06/222,218	5/24/83
4,385,102	06/249,252	5/24/83
4,385,103	06/306,905	5/24/83
4,385,139	06/310,074	5/24/83
4,385,155	06/326,484	5/24/83
4,385,181	06/233,109	5/24/83
4,385,184	06/236,950	5/24/83
4,385,194	06/355,176	5/24/83
4,385,206	06/216,814	5/24/83
4,385,221	06/261,073	5/24/83
4,385,251	06/305,881	5/24/83
4,385,254	06/267,474	5/24/83
4,385,288	06/260,195	5/24/83
4,385,289	06/260,202	5/24/83
4,385,345	06/222,336	5/24/83

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,523,873, Re. S.N. 07/063,090, Filed June 17, 1987, Cl. 404/124, VIBRATORY ROLLER WITH AXIALLY SPACED ZIG ZAG IMPACT BARS AND WIRE ROPE CLEANERS, Robert B. Elliot, Owner of Record: *Inventor,* Attorney or Agent: James C. Brooks, et al., Ex. Gp.: 250

4,634,880, Re. S.N. 07/063,474, Filed June 17, 1987, Cl. 250/566, CONFOCAL OPTICAL IMAGING SYSTEM WITH IMPROVED SIGNAL-TO-NOISE RATIO, James T. Lindow, et al., Owner of Record: *Siscan Systems, Inc., Campbell, Calif.,* Attorney or Agent: Robert S. Kelly, Ex. Gp.: 250

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

No Publications This Issue.

Patent Term Extension Private Law 98–46

The terms of U.S. Patents 3,507,954 and 3,507,961 granted Apr. 21, 1970 have been extended until Apr. 21, 1992 in accordance with Private Law 98–46, approved Oct. 19, 1984. The text of that law is as follows:

> Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Commerce, acting through the Commissioner of Patents and Trademarks, shall, when the following patents (relating to oral hypoglycemic drugs of the sulfonylurea class) expire, extend such patents until Apr. 21, 1992, with all the rights pertaining thereto:
>
> (1) Patent numbered 3,426,067.
> (2) Patent numbered 3,454,635.
> (3) Patent numbered 3,507,954.
> (4) Patent numbered 3,507,961.
> (5) Patent numbered 3,669,966.

DONALD J. QUIGG,
Assistant Secretary and Commissioner of Patents and Trademarks.

July 13, 1987.

Errata

"All reference to Patent No. 4,670,801 to Kunio Hirose, et al., of Japan, for 'MODE SETTING ARRANGEMENT FOR USE IN VIDEO TAPE RECORDER', appearing in the Official Gazette of June 2, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,671,128 to Kenneth R. Runde of Fla., for 'ROTARY SPEED REDUCER', appearing in the Official Gazette of June 9, 1987, should be deleted since no patent was granted."

"All reference to Patent No. 4,674,791 to Hayatsugu Harasaki of Hiroshima-ken, Japan, for 'AUTOMOBILE FRONT BODY CONSTRUCTION', appearing in the Official Gazette of June 23, 1987, should be deleted since no patent was granted."

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceedings sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives, shall enter an appearance within thirty days of this publication, the cancellation will be proceeded with as in the case of default.

Lehman Bros. Corp., Jersey City, N.J., Reg. No. 1,179,686, for the mark "GRAFFITI GUARD AND DESIGN", Canc. No. 16,020.

ERMA S. BROWN,
Administrator of the Trademark Trial and Appeal Board.
For MARGARET M. LAURENCE,
Assistant Commissioner for Trademarks.

Appeals to CAFC

In every case of an appeal to the CAFC from a decision of the Board of Patent Appeals and Interferences or the Trademark Trial and Appeal Board, a copy of the notice of appeal should be separately transmitted to the Office of the Solicitor at the time the original notice is filed with the Commissioner. The Solicitor's copy should be sent in an envelope addressed as follows:

> Box 8
> Commissioner of Patents and Trademarks
> Washington, D.C. 20231
> Attn: Office of the Solicitor

In lieu of mailing, the copy for the Solicitor may be hand-delivered to the Office of the Solicitor. Sending a copy of the notice of appeal to the Solicitor's Office will prevent or reduce delays in docketing appeals in the CAFC.

July 17, 1987.

DONALD W. PETERSON,
Deputy Commissioner of Patents and Trademarks.

Adverse Decisions in Interference

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees were not the first inventors with respect to the claims listed.

Patent No. 3,660,398, Kurt Ley, Ulrich Eholzer, Roland Nast and Florin Seng, PREPARATION OF QUINOXALINE-DI-N-OXIDES, Interference No. 101,024, decided Apr. 2, 1985, claims 1–3 & 5–9.

Patent No. 4,267,829, John H. Burton and Michael A. Mikulich, PENILE PROSTHESIS, Interference No. 100,779, decided July 21, 1986, claims 1–3, 5, 6, 8, 9 & 13.

Patent No. 4,322,424, Daniel Bouzard, Claude Perol, Jacques Stemer, Abraham Weber and Edmund S. Granatek, THE CRYSTALLINE GLUCOCONATE SALT OF M-AMSA AND COMPOSITIONS CONTAINING SAME, Interference No. 101,067, decided Jan. 12, 1987, claims 1–7.

NANNIE B. HENRY,
Deputy Clerk,
Board of Patent Appeals and Interferences.

Adverse Decisions in Interference.

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees are not entitled to patents containing the claims listed.

Patent No. 4,414,737, Atsuhiko Menjo and Shinji Saitoh, PRODUCTION OF SCHOTTKY BARRIER DIODE, Interference No. 101,569, decided Apr. 28, 1987, claims 1–9.

Patent No. 4,424,525, Takashi Mimura, HIGH ELECTRON MOBILITY SINGLE HETEROJUNCTION SEMICONDUCTOR DEVICES, Interference No. 101,517, decided May 7, 1987, claims 1 & 10–17.

Patent No. 4,542,124, Williams F. Huffman and Michael L. Moore, OCTAPEPTIDE VASOPRESSIN ANTAGONISTS, Interference No. 101,647, decided May 5, 1987, claims 1–12.

NANNIE B. HENRY,
Deputy Clerk,
Board of Patent Appeals and Interferences.

Patents Available for License or Sale

General Electric Co. is prepared to grant non-exclusive licenses under the following patents upon reasonable terms to domestic manufacturers.

Applications for license may be addressed to Group Patent Counsel, Major Appliance Business Group, General Electric Co., Appliance Park, AP2–226, Louisville, Ky. 402253.

4,620,344. FRICTION APPLYING ASSEMBLY.
4,628,443. TEST INITIATING APPARATUS FOR APPLIANCES HAVING SELF-DIAGNOSTIC TESTING CAPABILITY.
4,633,067. TOUCH CONTROL ARRANGEMENT FOR AN ELECTRICAL APPLIANCE.
4,633,770. VARIABLE DISCHARGE GRILL FOR ROOM AIR CONDITIONER.
4,633,850. RANGE OVEN VENT SYSTEM.
4,634,842. DIAGNOSTIC TESTING ARRANGEMENT FOR AN ELECTRIC COOKING APPLIANCE INCORPORATING COMMUTATED RELAY SWITCHING CIRCUITS.
4,634,843. DUAL MODE POWER CONTROL ARRANGEMENT FOR COOKING APPLIANCE.
4,639,578. TEMPERATURE SENSOR FAILURE DETECTION SYSTEM FOR COOKING APPLIANCE.
4,648,825. PLASTIC MOLDING APPARATUS.

241,743. COMBINED PENCIL SHARPENER AND CLIP, *Mark Lemieux*, 131 Wilding Ave., Sault Ste. Marie, Ontario, Canada P6A–4V2; (705) 949–1802.
3,878,539. PORTABLE ALARM DEVICE FOR HOME, OFFICE AND TRAVEL. ADJUSTABLE SLIDE-BRACKET HOOKS OVER DOOR TOPS IN SECONDS, *Chadyeane Gooding*, 3100–A Spring Hill Rd., Smyra, Ga. 30080.
3,996,987. CONVERTIBLE VALENCE, *Edith Rodriguez*, Box 2576, St. Thomas, U.S. Virgin Islands 00801.
4,089,341. CONNECTOR METHOD AND APPARATUS FOR COUPLING SYSTEMS TOGETHER WHILE EXCLUDING THE ENVIRONMENT FROM THE SYSTEM INTERIORS, *Akira Okaya*, 161 Heritage Hill Rd., New Canaan, Conn. 06840.
4,276,484. METHOD AND APPARATUS FOR CONTROLLING CURRENT IN INDUCTIVE LOADS, *C. Riverds*, P.O. Box 4757, Woodbridge, Va. 22194.
4,516,373. APPARATUS FOR TILE SETTING, *Yoshinori Osawa*, c/o V. M. Creedon, Wenderoth, Lind & Ponack, Suite 1100, 1750 Pennsylvania Ave., NW, Washington, D.C. 20006.

Stanley Miller, 19300 NW. Gillihan Rd., Portland, Oreg. 97231.

4,525,243. APPARATUS FOR DESALINATING WATER.
4,628,958. RING VALVE.

4,583,735. GOLF GAME APPARATUS, *Donald L. Knight*, 1720 Ala Moana Apt. H-204, Honolulu, Hi. 96815
4,643,207. CUTICLE MANICURING DEVICE, *Arnold Grahame*, 225 Hillturn La., Roslyn Hgts., Long Island, N.Y. 11577.
4,649,676. SHELTER CONSTRUCTION, *C. Regina Davey*, c/o Frederick L. Bergert, Law Offices, Nies, Webner, Kurz & Bergert, Suite 700, 1911 Jefferson Davis Hwy., Arlington, Va. 22202.
4,653,446. ROTARY INTERNAL COMBUSTION ENGINE, *Joseph F. Frasca*, 5801 Yorktown Rd., Lorain, Ohio 44053.
4,656,773. ENERGY EFFICIENT CASTING ROD, *Robert James Klefbeck*, 3 Dresden Ct., Albany, N.Y. 12203.

PATENT NOTICES

Certificates of Correction for the Week of Aug. 11, 1987

D. 280,660	4,628,260	4,648,061	4,657,677
D. 286,819	4,629,484	4,648,363	4,657,865
4,449,079	4,629,670	4,648,644	4,658,043
4,462,763	4,632,212	4,648,949	4,658,125
4,507,740	4,633,046	4,649,915	4,658,223
4,520,405	4,633,376	4,650,525	4,658,297
4,522,828	4,634,734	4,650,736	4,658,381
4,525,794	4,635,351	4,651,035	4,658,503
4,567,771	4,635,841	4,651,797	4,658,516
4,573,166	4,636,261	4,652,110	4,658,588
4,573,801	4,636,895	4,652,273	4,658,786
4,574,183	4,637,840	4,652,386	4,658,965
4,593,065	4,637,972	4,652,449	4,659,050
4,602,647	4,639,457	4,652,700	4,659,258
4,602,922	4,639,752	4,652,717	4,659,375
4,608,686	4,639,972	4,652,778	4,659,648
4,612,956	4,640,453	4,652,862	4,659,871
4,613,534	4,640,522	4,653,317	4,660,450
4,615,746	4,641,104	4,653,363	4,661,044
4,615,946	4,641,819	4,653,421	4,661,931
4,617,888	4,642,148	4,653,485	4,662,018
4,618,091	4,642,246	4,653,597	4,662,797
4,619,037	4,642,404	4,653,890	4,662,993
4,619,478	4,642,427	4,654,182	4,663,125
4,621,113	4,642,992	4,654,277	4,663,255
4,622,212	4,643,156	4,654,570	4,663,296
4,622,294	4,643,260	4,654,624	4,663,608
4,624,926	4,645,020	4,655,125	4,663,673
4,625,107	4,645,101	4,655,175	4,664,686
4,625,560	4,645,193	4,655,277	4,664,824
4,625,907	4,645,610	4,655,472	4,665,271
4,626,342	4,645,727	4,655,657	4,665,577
4,626,597	4,645,958	4,655,724	4,665,648
4,626,742	4,647,058	4,656,349	4,665,970
4,626,750	4,647,521	4,656,585	4,666,726
4,626,823	4,647,639	4,657,254	
4,628,093	4,648,037	4,657,527	

Disclaimers

4,575,885.—*Charles P. Hall*, Muir Beach, Calif. WATERBED MATTRESS WITH FREE FLOATING BAFFLE. Patent dated Mar. 18, 1986. Disclaimer filed Mar. 30, 1987, by the assignee, *Advanced Sleep Products.*

Hereby enters this disclaimer to claims 1–4 and 12–27 of said patent.

4,620,632.—*James C. Alemanni*, Oceanside, Calif. CARRIERS FOR PIN GRID ARRAY. Patent dated Nov. 4, 1986. Disclaimer filed May 19, 1987, by the assignee, *Alpha Modular Systems.*

Hereby enters this disclaimer to claims 1 and 4 of said patent.

4,629,046.—*Hans Martin*, Stuttgart, Fed. Rep. of Germany. FLUID FRICTION CLUTCH. Patent dated Dec. 16, 1986. Disclaimer filed May 29, 1987, by the assignee, *Sueddeutsche Kuehlerfabrik Julius Fr. Behr GmbH and Co. KG.*

Hereby enters this disclaimer to claims 8, 9, 10, 11, 12, 13 and 14 of said patent.

Disclaimers and Dedications

4,022,814.—*Barry N. Newton*, West Lafayette, Ind. IODINE CONTAINING ORGANIC CARBONATES FOR USE AS RADIOGRAPHIC AGENTS. Patent dated May 10, 1977. Disclaimer and Dedication filed Dec. 30, 1986, by the assignee, *Alcon Laboratories, Inc.*

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,077,901.—*John L. Arnold* and *Raymond W. Boyle*, Midland, Mich. ENCAPSULATION OF NUCLEAR WASTES. Patent dated Mar. 7, 1978. Disclaimer and Dedication filed May 26, 1987, by the assignee, *The Dow Chemical Co.*

Hereby disclaims and dedicates to the public the entire term of said patent.

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	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2122
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	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
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	Springfield: Illinois State Library	(217) 782-5430
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	Boston Public Library	(617) 536-5400 Ext. 265
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	Detroit Public Library	(313) 833-1450
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	St. Louis Public Library	(314) 241-2288 Ext. 390
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New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
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	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
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Oregon	Salem: Oregon State Library	(503) 378-4239
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*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF July 4, 1987

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	4-10-86
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	1-30-86
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	1-23-86
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	2-18-86
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	1-30-85
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	9-07-84
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	11-4-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	4-30-85
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	6-13-85
DESIGN, GROUP 290—K. L. CAGE, Director	1-14-85
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	3-12-86
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	10-04-85
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	10-15-85
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	1-31-86
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	10-01-86

Expiration of patents: The patents within the range of numbers indicated below expire during July 1987, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,518,701 to 3,522,400, inclusive

Plant Patents ..... Numbers 2,977 to 2,985 inclusive

REEXAMINATIONS

AUGUST 11, 1987

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,004,892 (741st)

COOKWARE FABRICATED FROM COMPOSITES OF COPPER, ALUMINUM AND STAINLESS STEEL

John B. Ulam, McMurray, Pa., assignor to Clad Metals, Inc., Canonsburg, Pa.

Reexamination Request No. 90/001,034, Jun. 17, 1986.
Reexamination Certificate for Patent No. 4,004,892, issued Jan. 25, 1976, Ser. No. 572,732, Apr. 29, 1975.
Division of Ser. No. 423,253, Dec. 10, 1973, Pat. No. 3,952,938.
Int. Cl.[4] B32B *15/01*
U.S. Cl. 428—652

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1 and 3 are determined to be patentable as amended.

Claim 2, dependent on an amended claim, is determined to be patentable.

1. A hot pressure bonded metallic composite consisting essentially of a core which consists of a member from the group consisting of copper and copper alloys completely coated *on at least one side* by a member from the group consisting of *wrought* aluminum and *wrought* aluminum alloys, said core forming a major thickness portion of said composite, and at least one outer cladding layer of stainless steel, *on the aluminum opposite the copper all bonded by a diffusion bond.*

B1 4,444,953 (742nd)

ASSYMETRIC BLOCK COPOLYMERS AND CORRESPONDING ADHESIVE FORMULATIONS

David J. St. Clair, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Reexamination Request No. 90/001,018, May 30, 1986.
Reexamination Certificate for Patent No. 4,444,953, issued Apr. 24, 1984, Ser. No. 485,768, Apr. 18, 1983.
Division of Ser. No. 320,233, Nov. 12, 1981, Pat. No. 4,391,949.
Int. Cl.[4] C08L *9/00*
U.S. Cl. 525—98

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1–10 are now disclaimed.

[1. An adhesive composition comprising a block copolymer having the star-shaped, asymmetrical structure

$(A\text{-}B)_xY\text{—}C)_z$

where A is a polymer block of a monoalkenyl arene, B is a polymer block of a conjugated diene, C is a polymer block of a conjugated diene, Y is the residue of a multifunctional coupling agent, the sum of x plus z is greater than 6 and less than about 25, the ratio of x is z is between about 5 to 1 and about 1 to 5, the molecular weight of each block A is between about 3,000 and about 30,000, the molecular weight of each block B is between about 15,000 and about 100,000, and the molecular weight of each block C is between about 15,000 and about 100,000 and a tackifying resin.]

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,469

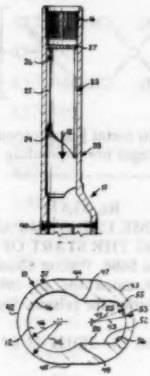
SIDE POCKET MANDREL

David T. Merritt, Celina; David W. Fish, Carrollton, and Olen R. Long, Celina, all of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Original No. 4,416,330, dated Nov. 22, 1983, Ser. No. 350,283, Feb. 19, 1982. Application for reissue Apr. 17, 1985, Ser. No. 724,471

Int. Cl.[4] E21B *23/02*

U.S. Cl. 166—117.5 20 Claims



10. The side pocket mandrel of claim 8 wherein that portion of said mandrel body having the longitudinally extending groove therein is an extruded tube.

Re. 32,470

DISC BRAKES FOR VEHICLES

Andrew C. W. Wright, Warwickshire, England, assignor to Lucas Girling Limited, Birmingham, England

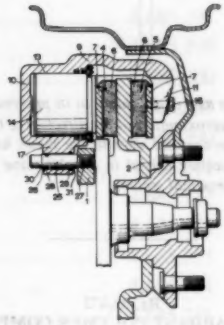
Original No. 4,261,443, dated Apr. 14, 1981, Ser. No. 946,213, Sep. 27, 1978. Division of Ser. No. 802,809, Jun. 2, 1977, Pat. No. 4,151,899, which is a continuation of Ser. No. 626,184, Oct. 18, 1975, abandoned. Application for reissue Apr. 14, 1983, Ser. No. 485,106

Claims priority, application United Kingdom, Nov. 5, 1974, 47710/74

Int. Cl.[4] F16D *65/14*

U.S. Cl. 188—73.44 13 Claims

1. A disc brake for a vehicle comprising a rotatable disc, a relatively stationary drag taking member located adjacent said disc and having circumferentially spaced arms extending over the periphery of said disc and each including a drag taking abutment surface, first and second friction pad assemblies for engagement with opposite faces of the disc, each of said assemblies having circumferentially spaced parts slidably engaging the respective arms of said drag taking member and being guided for movement with respect to said disc between said arms on said abutment surfaces which take the drag on both said pad assemblies when said brake is applied, means cooperating with said stationary drag taking member and with said friction pad assemblies for preventing substantial radial movement of said assemblies relative to said arms when said assemblies are engaged with said arms, a caliper member straddling both the peripheral edge of said disc and said friction pad assemblies, a limb of said caliper member acting on said second friction pad assembly, actuating means housed in said caliper member on one side of said disc for applying said first friction pad assembly directly to an adjacent face of said disc, guide means on said one side of said disc for slidably mounting said caliper member on said drag taking member, *said guide means being the only means by which said caliper is directly and slideably mounted on said drag-taking member* for movement relative to said disc, said guide means comprising [only] a single element located at one circumferential position on said one side of said disc and within the periphery thereof, said caliper member being slidably mounted on said single element for movement relative to said disc in a direction parallel to the axis thereof whereby said second friction pad assembly is adapted to be applied to said disc through said limb by the reaction of said caliper member to said actuating means, and said element being



secured to one of said members and extending into a clearance opening in the other of said members, resilient means disposed between said element and said opening to permit relative movement in a radial direction between said element and said opening to occur in response to movement of said second friction pad assembly from one of said abutment surfaces to the other when the brake is applied with the direction of rotation of said disc reversed, said resilient means complementing said guide means while being free of any drag on either of said friction pad assemblies when said brake is applied irrespective of said direction of rotation of said disc, and guiding and anti-rotation means for said caliper member on the side of said disc opposite said one side comprising a coupling between said limb of said caliper member and said second friction pad assembly.

Re. 32,471

HIP JOINT PROSTHESIS WITH A SHAFT TO BE FITTED INTO THE MEDULLARY CANAL OF THE FEMUR

Arnold Keller, Kaihude, Fed. Rep. of Germany, assignor to Waldemar Link GmbH & Co., Hamburg, Fed. Rep. of Germany

Original No. 4,435,854, dated Mar. 13, 1984, Ser. No. 247,776, Mar. 26, 1981. Application for reissue Jan. 23, 1985, Ser. No. 693,879

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1980, 3015 690

Int. Cl.[4] A61F *2/36*

U.S. Cl. 53—23 4 Claims

3. In a hip joint prosthetic device comprising a rigid shank to be fitted into the medullary canal of the femur, a head, and a neck section extending between the proximal end of the shank and the head, the head being anteverted relative to the shank in the LM (lateral-medial) plane, the improvement wherein the shank has, in

the proximal region thereof, a section extending a distance between approximately 4–8 cm from the proximal end of the shank which is curved in the AP (anterior-posterior) plane with a center of curvature in the AP plane anterior of the proximal region of the

shank, wherein the axis of the shank at its proximal end extends, in the AP plane, approximately in the direction of the longitudinal axis of the neck section and wherein the shank has, in the distal region thereof, a section curved in the AP plane in the opposite direction to said proximal section.

Re. 32,472

FLAME-RETARDANT POLYMER COMPOSITIONS CONTAINING AMINE SALTS

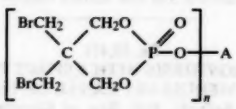
Yuval Halpern, Skokie, Ill., assignor to Borg-Warner Chemicals, Inc., Parkersburg, W. Va.

Original No. 4,365,033, dated Dec. 21, 1982, Ser. No. 279,634, Jul. 2, 1981. Application for reissue Apr. 2, 1984, Ser. No. 596,128

Int. Cl.⁴ C08K *5/34*

U.S. Cl. 524—100 **3 Claims**

1. A composition comprising a normally flammable polymer and a minor porportion, sufficient to impart flame-retardant properties to said composition, of a salt of 5,5-bis (bromomethyl)-2-hydroxy-2-oxo-1,3,2-dioxaphosphorinane having the structure



where A is a [polyvalent metal or] protonated amino-s-triazine group and n is an integer corresponding to the valence of A.

Re. 32,473

FLAME-RETARDANT POLYMER COMPOSITIONS CONTAINING METAL SALTS

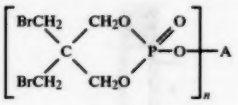
Donna Mott, Des Plaines, Ill., assignor to Borg-Warner Chemicals, Inc., Parkersburg, W. Va.

Original No. 4,365,033, dated Dec. 21, 1982, Ser. No. 279,634, Jul. 2, 1981. Application for reissue Apr. 2, 1984, Ser. No. 596,129

Int. Cl.⁴ C08K *5/52*

U.S. Cl. 524—118 **8 Claims**

1. A composition comprising a normally flammable polymer and a minor porportion, sufficient to impart flame-retardant properties to said composition, of a salt of 5,5-bis (bromomethyl)-2-hydroxy-2-oxo-1,3,2-dioxaphosphorinane having the structure



where A is a polyvalent metal [or protonated amino-s-triazine group] and n is an integer corresponding to the valence of A.

Re. 32,474

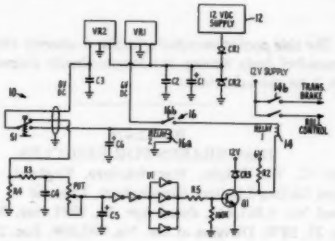
VARIABLE TIME DELAY APPARATUS FOR CONTROLLING THE START OF A VEHICLE

Dennis Reid, P.O. Box 5684, Walnut Creek, Calif. 94596

Original No. 4,467,219, dated Aug. 21, 1984, Ser. No. 385,542, Jun. 7, 1982. Application for reissue Aug. 20, 1986, Ser. No. 898,312

Int. Cl.⁴ H01H *43/04*

U.S. Cl. 307—10 R **20 Claims**



12. A variable time delay circuit for controlling the start of a vehicle after a preset period of delay wherein said vehicle is started by engaging the engine of said vehicle and braking means to hold said vehicle, then disengaging said braking means after said period of delay, said apparatus, having electrical power supplied thereto, comprising:

relay means for selectively engaging and disengaging said braking means;

adjustable time delay means for setting said period of delay; and

switch means for selectively causing said relay means to engage said brake means and to disengage said brake means after said period of delay.

PATENTS

GRANTED AUG. 11, 1987

ERRATA

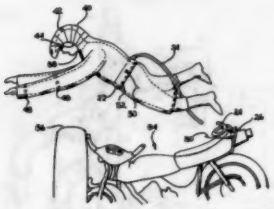
For CLASS	See PATENT NO.
437-041	4,685,194
437-041	4,685,195
437-041	4,685,196
437-195	4,685,197
437-073	4,685,198
437-215	4,685,200
209-571	4,685,567
221-241	4,685,590
251-306	4,685,611
293-128	4,685,712
439-096	4,685,752
439-074	4,685,753
439-270	4,685,754
439-404	4,685,755
439-426	4,685,756
439-426	4,685,757
439-606	4,685,758
200-051	4,685,759
439-822	4,685,760
439-843	4,685,761
264-083	4,685,873
073-583	4,685,966
437-081	4,685,979
425-047	4,686,129
430-190	4,686,280
379-269	4,686,330
503-200	4,686,546
503-207	4,686,547
503-213	4,686,548
360-038	4,686,563
362-072	4,686,656
381-073	4,686,693

PATENTS

GRANTED AUGUST 11, 1987

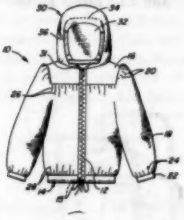
GENERAL AND MECHANICAL

4,685,151
MOTORCYCLE SAFETY APPAREL
Dan Kincheloe, 420 Monterey La., Apt. 3-D, San Clemente, Calif. 92672
Continuation-in-part of Ser. No. 543,415, Oct. 19, 1983, abandoned. This application Mar. 28, 1985, Ser. No. 717,071
Int. Cl.[4] A41D *13/02*
U.S. Cl. 2—2 **36 Claims**



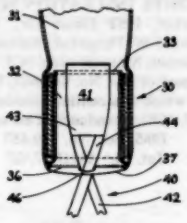
1. A protetive system for a motorcyclist comprising:
a source of a pressurized gas;
a protective device worn around the waist of a person, said protective device being inflatable with pressurized gas to expand and provide protection to the waist region, said protective device further having upper and lower portions generally circumferentially surrounding said waist region and being folded thereabout in the uninflated state, and inflatable to extend substantially upward and downward when inflated with pressurized gas to protect regions above and below the waist of the person;
means for coupling said source of pressurized gas to said protective device; and
means for releasing said pressurized gas into said protective device in the advent of an emergency situation.

4,685,152
INSECT PROTECTIVE GARMENT
Nicole G. Heare, 1752 Vine St., Berkeley, Calif. 94703
Filed Oct. 23, 1984, Ser. No. 664,046
Int. Cl.[4] A42B *3/00*
U.S. Cl. 2—4 **5 Claims**



1. A protective garment comprising:
A. an insect-impervious yoke having a neckhole, said yoke extending downwardly from said neckhole to the front and the rear thereof;
B. piping having a diameter of at least 0.75 cm attached to the lower edges of said yoke;
C. semi-rigid mesh material connected to said yoke in gathers outside of said piping, whereby said piping holds said mesh material away from a user's chest and back.

4,685,153
ATHLETIC KNEE PROTECTOR
Leon Sims, 4709 California St., Omaha, Nebr. 68132-2503
Filed May 27, 1986, Ser. No. 866,900
Int. Cl.[4] A61E *13/06*; A41D *13/06*
U.S. Cl. 2—24 **3 Claims**



1. A knee protector, comprising:
a sheet of rigid material, generally oval in shape, the length of its shorter axis being slightly greater than the vertical dimension of a kneecap and the length of its longer axis being slightly greater than the horizontal distance from a point beyond the midpoint of one side of the femur around the kneecap to a point beyond the midpoint of the other side of the femur:
wherein said material is curved along its longer axis so as to fit over and follow the general contour of the front and sides of the knee; and
means for holding the central portion of said sheet of material substantially over the kneecap,
wherein said material holding means includes:
knee-length pants of stretch fabric tailored to fit snugly in the vicinity of the knee;
a pocket inside the leg of said pants located and sized to hold said sheet of material substantially over the kneecap, said pocket being open along it upper edge for the insertion of said sheet of material;
a flap having a first end attached inside the leg of said pants along a line just above and parallel to the opening of the pocket; and
means for holding the second end of said flap downwardly against said pocket so as to be generally fixed in position with respect to the lower leg, independent of said pants.

4,685,154
APRON AND INFANT TOWEL
Lynn T. Smith, 1128 Jeffrey Ct., Northbrook, Ill. 60062
Filed Aug. 6, 1979, Ser. No. 63,844
Int. Cl.[4] A41B *13/10*
U.S. Cl. 2—48 **4 Claims**

1. A method of toweling an infant or other objects to be dried with a towel having front and back panels connected by shoulder straps, including the steps of: placing the towel on the

human user with the front panel on the user's front and the back panel on the user's back, with the shoulder straps across the user's shoulders, placing the object to be dried on the front panel, and bringing the back panel over the user's head and into engagement with the object and the front panel so that both front and back panels are utilized to dry the object.

4,685,155

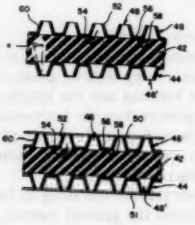
COMPOSITE INSULATION MATERIAL

Arthur L. Fingerhut, 1052 Elston Dr., Mountainside, N.J. 07092, and Howard W. Fingerhut, Edison, N.J., assignors to Arthur L. Fingerhut, Mountainside, N.J.

Continuation-in-part of Ser. No. 493,667, May 11, 1983, Pat. No. 4,583,247, which is a continuation-in-part of Ser. No. 348,224, Feb. 12, 1982, abandoned. This application Mar. 8, 1985, Ser. No. 709,457

Int. Cl.[4] A41D *27/02*

U.S. Cl. 2—272 **70 Claims**



1. A heat insulating garment and the like for heat retention, comprising:

an outer fabric shell adapted to be disposed to cover a portion of the body of a wearer;

a composite interlining sheet material for said fabric shell, said composite interlining sheet material including (i) a substantially continuous internal layer of porous material having a low heat conductivity and high resiliency, said internal layer being of a substantially uniform thickness and consistency and having a composition and thickness such that it is supple and drapable, and said internal layer having first and second surfaces, and (ii) a flexible sheet of liquid impermeable material having a first surface and a second surface, said flexible sheet having a plurality of capillary openings extending therethrough, each of said openings having a base open to said first surface of said flexible sheet and lying substantially in the plane of said flexible sheet, and an apex extending away from said second surface of said flexible sheet and remote from the plane of said flexible sheet, said openings being of a character so as to inhibit the flow of fluids through said openings, and said flexible sheet being adhered to said internal layer so that said first surface of said flexible sheet faces said first surface of said internal layer and said second surface of said flexible sheet faces away from said internal layer so that said apexes of said openings are remote from said first surface of said internal layer; and

said composite interlining sheet material being disposed in fixed relation to said outer fabric shell.

4,685,156

ADJUSTABLE WATER TEMPERATURE SAFETY CONTROL UNIT

James A. Brabazon, Box 363, 148 County Hwy. S., Maiden Rock, Wis. 54750

Filed Jun. 11, 1986, Ser. No. 872,801

Int. Cl.[4] F16K *11/16*

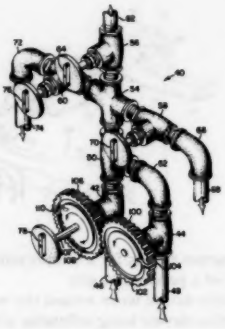
U.S. Cl. 4—194 **10 Claims**

1. An adjustable water temperature control for connection between hot and cold water supply lines and a discharge outlet, which comprises:

a pair of control valves, one control valve being connected in the hot water supply line and the other control valve being connected in the cold water supply line;

each control valve being operable to the same extent between open and closed positions;

means interconnecting said control valves for inverse simultaneous operation over a limited adjustable range in at least one direction for mixing the hot and cold water to the desired temperature in the range; and



a shut-off valve connected between said control valves and the discharge outlet for controlling flow rate;

said means interconnecting said control valves including:

a pair of gears, one being connected to one control valve and the other being connected to the other control valve;

said gears being meshed together for rotation in opposite directions;

a manual control knob connected to one of said gears; and

means removably secured to one said gears for interfering engagement with the other gear to limit rotation of said gears in the said one direction.

4,685,157

TOILET AID

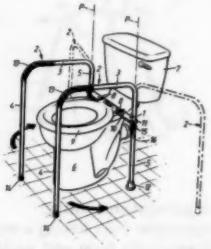
David R. James, "Glenyard" , England, assignor to James Industries Limited, Gloucester, England

Filed Jun. 20, 1986, Ser. No. 876,424

Claims priority, application United Kingdom, Jul. 9, 1985, 8517317

Int. Cl.[4] E03D *11/00*

U.S. Cl. 4—254 **7 Claims**



1. A toilet aid comprising a rear fixing bracket, said bracket being adapted for mounting on a WC pan using the normal seat-attachment bolt holes of the latter, side user support arms pivotally supported by said bracket for separate pivotal movement about respective vertical axes, front support legs continuous with said side arms extending downwardly to contact the

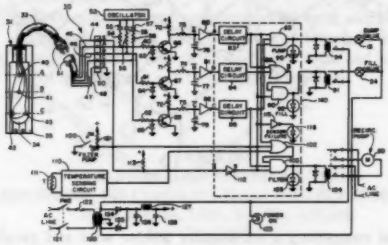
floor, rear support legs continuous with said side arms which in use are supported directly on the floor, said rear support legs passing through said bracket which provides solely side support for said rear support legs, and bearing cups fixable to the floor adapted to receive bottom ends of said rear support legs so to provide lateral location for the bottom ends of said rear support legs.

4,685,158

SWIMMING POOL CONTROL SYSTEM

Olin A. Lively, 4375 Shady Bend, Dallas, Tex. 75234

Filed Feb. 20, 1985, Ser. No. 703,272
Int. Cl.[4] E04H *3/16*
U.S. Cl. 4—508 **12 Claims**



1. A system for maintaining water at a predetermined nominal level within a swimming pool wherein the surface of the water is subject to repeated disturbances, said system being adapted to control a fill valve to add water to the pool as required, comprising:

nominal water level sensing means positioned in the pool at the predetermined nominal level and including an electrical contact exposed to the disturbed surface of the water in the pool for producing an output signal indicative of the instantaneous presence or absence of water at the predetermined nominal level;

delay circuit means for producing a first control signal indicative after a first predetermined sensing period of the continuous uninterrupted presence of said output signal during said entire first sensing period, and a second signal indicative after a second predetermined sensing period of the continuous uninterrupted absence of said output signal during said second entire sensing period;

control circuit means for closing the fill valve in response to said first control signal, and for opening the fill valve in response to said second control signal to maintain the water in the swimming pool at the predetermined level and monitor circuit means for inhibiting operation of the fill valve upon interruption of electrical communication with said electrical contact, wherein the electrical contact is mounted on an exposed side wall of the pool and is vertically adjustable relative to the bottom of said swimming pool.

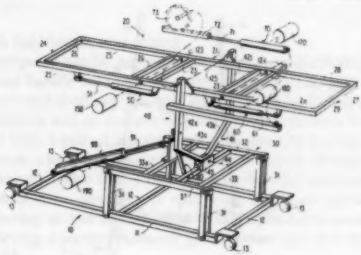
4,685,159

HOSPITAL BED

Hans Oetiker, Oberdorfstrasse 21, CH-8810 Horgen 2, Switzerland

Filed May 9, 1985, Ser. No. 732,269
Int. Cl.[4] A61G *7/00*
U.S. Cl. 5—61 **17 Claims**

1. A hospital bed, comprising a chassis means including rigidly interconnected longitudinal and cross bearer members, bed frame means including a center bed frame section, a head bed frame section pivotally connected about a first transverse axis to the center bed frame section near one end therof and a foot bed frame section pivotally connected about a second transverse axis to the center bed frame section near the other end thereof, a first intermediate frame means pivotally supporting the center bed frame section intermediate its ends about a single third transverse axis to provide pivotal movement of the bed frame means about said third transverse axis in either direction of rotation, a second intermediate frame means pivotally supporting said first intermediate frame means about a longitudinal axis to enable tilting of said first intermediate frame means together with said bed frame means about said longitudinal axis in either direction of rotation, means so connecting said second intermediate frame means with said chassis means that said bed frame means can be pivoted into an at least nearly vertical position with the foot bed frame section at the bottom without interference by the corresponding cross bearer member of the chassis means so as to enable a patient to get on and off the hospital bed in an ambulatory manner, and first, second, third, fourth, and fifth actuating means for respectively



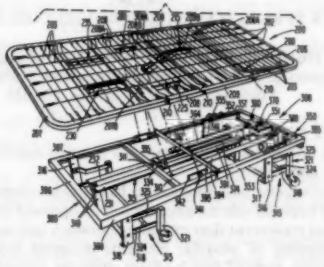
causing (a) pivotal movement of the head bed frame section relative to the bed center frame section about the first transverse axis, (b) pivotal movement of the foot bed frame section relative to the bed center frame section about the second transverse axis, (c) pivotal movement of the bed frame means relative to the first intermediate frame means and therewith relative to the second intermediate frame means and the chassis means about the third transverse axis, (d) pivotal movement of the first intermediate frame means and therewith of the bed frame means relative to the second intermediate frame means and therewith relative to the chassis means about the longitudinal axis, and (e) adjustment in height of the second intermediate frame means and therewith of the first intermediate frame means and of the bed frame means relative to the chassis means.

4,685,160

PORTABLE BED ASSEMBLY

Dennis P. Rizzardo, Phoenixville, Pa., assignor to McKesson Corporation, San Francisco, Calif.

Filed Apr. 25, 1985, Ser. No. 726,810
Int. Cl.[4] A61G *7/00*; A47C *19/00*
U.S. Cl. 5—68 **17 Claims**



1. A portable bed assembly including a spring deck assembly

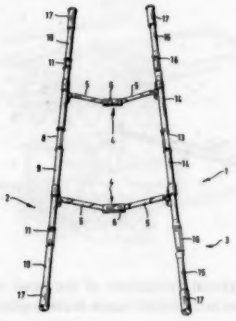
and a separable frame assembly comprising: spring deck assembly means for supporting a patient in multiple positions, said spring deck assembly means being separable from said seperable frame assembly, portable and foldable to facilitate transport; and separable frame assembly means for releasable engagement with and support of said spring deck assembly means in said multiple positions, said separable frame assembly means being separable to facilitate transport.

4,685,161

FOLDABLE FRAMEWORK AND PORTABLE OBJECTS HAVING SUCH A FRAMEWORK

Zaharia Zalman, 50 Hankin Street, Holon 58 330, Israel

Filed Mar. 17, 1986, Ser. No. 840,507
Claims priority, application Israel, Apr. 3, 1985, 74891
Int. Cl.[4] A61G *1/00*; A47C *19/16*
U.S. Cl. 5—82 R **6 Claims**



1. A foldable framework comprising first and second carrier rod assemblies linked to each other by foldable connecting means, each of said first and second carrier rod assemblies comprising a central joint, a pair of inner rods each pivoted to one edge of the central joint such that said inner rods can be folded towards each other around a folding axis that extends in space in a direction normal to the longitudinal axis of the central joint, a pair of extreme rods each linked to the associated inner rod by a peripheral joint so as to be foldable about a folding axis extending in space in a direction that forms an angle with the folding axis of the central joint; the folding axis of the peripheral joint of the first carrier rod assembly extending in space essentially normal to the folding axis of the central joint and the folding axis of the second carrier rod assembly extending in space in a direction that forms with the folding axis of the central joint an angle other than 90° such that in the folded state the extreme rods of the second carrier rod assembly come to rest between the extreme rods of the first carrier rod assembly.

4,685,162

BOX SPRING HAVING IMPROVED COIL SPRING MODULES

Larry Higgins, and Thomas J. Wells, both of Carthage, Mo., assignors to Leggett & Platt, Incorporated, Carthage, Mo.

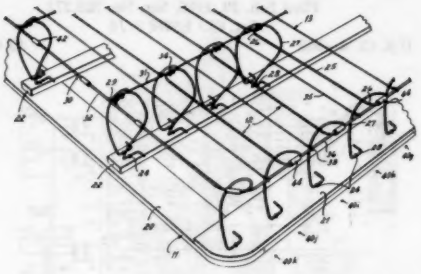
Filed Apr. 22, 1986, Ser. No. 854,531
Int. Cl.[4] A47C *23/02, 23/00*
U.S. Cl. 5—247 **9 Claims**

1. A box spring for supporting a bedding mattress, said box spring comprising

a rectangular base frame, said base frame comprising a pair of opposed side members, a pair of opposed end members, and transverse slats extending between said side members,

a plurality of modular elements mounted atop said base frame, each of said modular elements comprising a horizontal straight center section terminating in curved horizontal end sections, at least some curved end sections having spring sections extending vertically downwardly therefrom, said modular elements being arranged in parallel rows with adjacent elements of each row having aligned straight center sections and overlapping curved sections, said spring sections of said modular elements each including a single revolution coil spring approximately five inches in height and two inches in diamenter extending between said curved sections of said modular elements and said base frame,

a wire grid mounted atop said modular elements, said wire



grid comprising a rectangular border wire and parallel grid substantially straight, non-helical wires extending between opposed sides of said border wire, said border wire being connected to the endmost curved sections of said rows of modular elements and said parallel grid wires being fixedly secured to said overlapping curved sections of adjacent modular elements to secure adjacent modular elements of a row of modular elements to one another,

a fabric pad overlying said wire grid, and

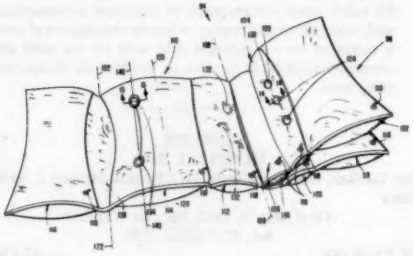
an upholstered covering encasing said base frame, said modular elements, said wire grid, and said fabric pad.

4,685,163

RECLINER FOR MEDICAL CONVALESCENCE

Jeffrey B. Quillen, P.O. Box 144, Mooresville, Ind. 46158, and James G. Spahn, 4500 Kessler Blvd., East Dr., Indianapolis, Ind. 46220

Continuation-in-part of Ser. No. 723,818, Apr. 16, 1985, Pat. No. 4,639,960. This application Jun. 28, 1985, Ser. No. 750,318
The portion of the term of this patent subsequent to Feb. 3, 2003, has been disclaimed.
Int. Cl.[4] A47C *27/10*; A61G *7/04*
U.S. Cl. 5—455 **18 Claims**



1. A portable recliner for supporting a person in a supine position comprising:

a substantially wedge-shaped back and head support extending upwardly at an angle between 30 degrees and 45 degrees and including a plurality of individual wedge shaped, air inflatable, cushions positioned and intercon-

nected together in a vertical stack with a support surface of a first length equal to at least the distance between the coccyx and the top of the head;

a substantially wedge-shaped leg and foot support extending upwardly from an edge area adjacent the back and head support at a first angle between 20 degrees and 30 degrees for elevation of the popliteal fossa through a second angle between 120 degrees and 150 degrees and including a plurality of individual wedge shaped, air inflatable, cushions positioned and interconnected together in vertical stacks with a support surface of a second length equal to the distance between the coccyx and the popliteal fossa;

a valve means on said cushions operable to allow inflation of each at a desired internal air pressure to determine said angles; and,

connecting means interconnecting said back and head support and said leg and foot support together, including interconnecting said cushions of said back and head support and said leg and foot support together.

4,685,164

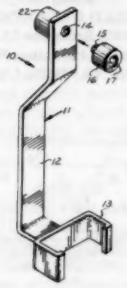
AIR BRAKE ADJUSTMENT TOOL

Adam Sebalos, 140 Charles St., Jersey City, N.J. 07307

Filed Jan. 16, 1986, Ser. No. 819,360

Int. Cl.[4] B25F *1/00*

U.S. Cl. 7—138 **1 Claim**



1. An air brake adjustment tool, comprising, a main body lying in a plane and forming handle grip means for using said tool, said main body having a front and a rear flat surface, a striker block fixedly secured to said rear flat surface of said main body for freeing a seized locking collar of a slack adjuster attached to the piston rod of a brake air cylinder, an opening provided through an upper end of said main body and removably receives a wrench socket which is received on the head of an adjustment screw in the body of said slack adjuster; said socket projecting from said front flat surface of said main body, a longitudinal axis of said striker block aligns with a longitudinal axis of both the opening and said socket, for applying a direct force to said socket received on said adjustment screw and said locking collar, the force being applied to a free end of said striker block by hammer means that frees a usually seized said locking collar in the body of said slack adjuster pivotally attached to said piston rod of said brake air cylinder; said longitudinal axis of the opening, said socket, and said striker block lying in a plane perpendicular to the plane of the main body, and a channel grip member is fixedly secured to the bottom end of said main body, at a center near outside surface of said channel, for engagement with the body of said slack adjuster such that when said main body is pulled by a user at said upper end, said slack adjuster pivots and moves said piston rod, enabling said user to check the stroke of said piston rod.

4,685,165

HAIR BRUSH

Joe E. Fronius, Excelsior, Minn., assignor to Turn-N-Tame Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 649,915, Sep. 12, 1984, abandoned, which is a continuation-in-part of Ser. No. 643,841, Aug. 23, 1984, abandoned, which is a continuation-in-part of Ser. No. 598,518, Apr. 9, 1984, abandoned. This application Nov. 29, 1985, Ser. No. 803,114

Int. Cl.[4] A46B *7/10*

U.S. Cl. 15—27 **1 Claim**

1. A hair brush, comprising:

a one-piece handle having a grip portion and a shaft portion, said handle having a shoulder separating said grip portion and said shaft portion, said shaft portion including a bering portion and an end portion, said bearing portion including at least a pair of spaced apart ribs, said ribs having a maximum transverse diameter, said end portion having a cylindrical portion with a first diameter less than said maximum transverse diameter of said ribs, said end portion also having an end cap attached to said cylindrical portion and having a second diameter greater than said first diameter; and

a one-piece core member having a bristle portion and a braking control portion, said core member including a plurality of bristles integrally extending radially outwardly from said bristle portion, said braking control portion having an end abutting said shoulder, said core member having a cylindrical passage for receiving said shaft portion, said core member having an end wall opposite from said braking control portion end for partially closing said cylindrical passage, said end wall having a circular opening centered on the same axis as said cylindrical passage, said ribs of said bearing portion of said handle being spaced from said end wall, said circular opening for receiving said cylindrical portion of said shaft portion and having a third diameter less than the second diameter of said end cap, said handle being free to rotate with respect to said circular opening of said end wall;

so that said shaft portion fits within said cylindrical passage to allow said core member to rotate on said ribs, said cylindrical portion fitting through said circular opening, said core member being retained for rotation between said shoulder and said end cap, thereby creating said hair brush with a rotatable core member from only two different one-piece members.

4,685,166

APPARATUS FOR WASHING VEHICLES INCLUDING PLASTIC BEARINGS

James A. Belanger, Northville, Mich., assignor to Belanger, Inc., Northville, Mich.

Filed Dec. 23, 1985, Ser. No. 812,419

Int. Cl.[4] B60S *3/04*

U.S. Cl. 15—97 B **5 Claims**

4. An apparatus for washing vehicles comprising:

a frame;

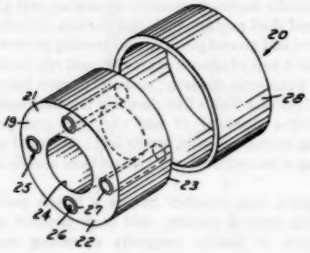
a plurality of arms pivotally attached to the frame by an upper shaft which extends through said arms and said frame;

said upper shaft being journalled directly within upper bearings attached to each of said arms, each of said upper bearings including a unitary block of high molecular weight plastic having a cylindrically shaped upper bearing bore centrally disposed within said block, said upper

bearing bore having a cylindrical wall consisting of said high molecular weight plastic said cylindrical wall defining the bearing surface of said upper bearing for the journalled support of said rotatable upper shaft and fastener bores with parallel axes to the axis of said upper bearing bore, said fastener bores extending through said block having sleeve means retained therein for receiving a fastener and permitting the upper bearing to be securely attached to the arm without deforming the upper bearing bore and causing the upper bearing bore to exert pressure upon the shaft received directly in the upper bearing bore;

a plurality of racks secured to the lower end of said arms including means for retaining cloth finishing material being adapted to be moved therewith for cleaning the vehicle;

a lower shaft being received in lower bearings, said lower bearings including a unitary block of high molecular



weight plastic having a cylindrically shaped lower bearing bore centrally disposed within said block, said lower bearing bore having a cylindrical wall consisting of said high molecular weight plastic, said cylindrical wall defining the bearing surface of said lower bearing for the journalled support of said rotatable lower shaft and fastener bores extending through said block and having parallel axes to the axis of said lower bearing bore, said fastener bores, including sleeve means retained within the fastener bores for receiving a fastener and permitting each bearing to be securely attached to one arm at a point intermediate the upper shaft and said racks without deforming the lower bearing bore and causing the lower bearing bore to exert pressure upon the shaft received directly in the lower bearing bore; and

power means attached to said frame and operatively connected to each of said arms by a linkage for driving said arms in a reciprocating arcuate path.

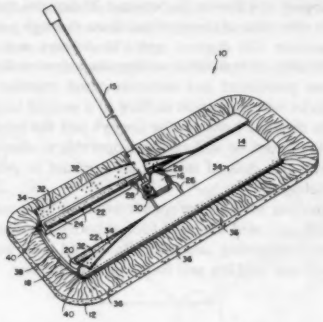
4,685,167

MOP CONSTRUCTION

John H. Murray, LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Oct. 25, 1985, Ser. No. 791,366
Int. Cl.[4] A47L *13/24*
U.S. Cl. 15—228 **13 Claims**

1. An improved mop construction comprising: a mop head, said mop head being substantially flat on one side thereof, said mop head having means on the other side thereof to accomodate a mop handle, said mop head having a plurality of fastening strips mounted thereon on the side thereof opposite to said substantially flat side, said fastening strips being provided with a plurality of closely spaced interengageable hooks, and a mop having its backing substantially flush with the flat side of said mop head and having elongated fastening strips connected thereto, said elongated strips having a plurality of loop mem-



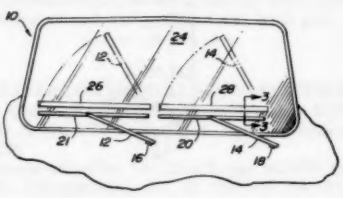
bers thereon, said fastening strips on said mop being wrapped around the edge of said mop head and having its loop members in engagement with the hook members on top of said mop head.

4,685,168

WINDSHIELD CLEANING SYSTEM

John F. Mastromoro, 3603 Brompton Ct., Liverpool, N.Y. 13090

Filed Mar. 28, 1986, Ser. No. 845,454
Int. Cl.[4] B60S *1/02*
U.S. Cl. 15—250 R **2 Claims**

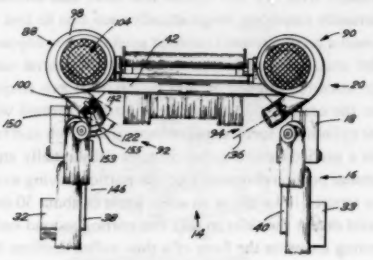


1. In a vehicle windshield cleaning system wherein an elongated wiper blade is mounted for reciprocating movement between predetermined initial and terminal positions by power driven means with a longitudinal edge of said blade in contact with the outer windshield surface, the improvement comprising a first strip of transparent, smooth non-abrasive surfaced material adhesively secured to and extending forwardly from said outer windshield surface, said first strip having a pair of parallel, sharp, longitudinal edges having length at least substantially equal to that of said wiper blade, a width of substantially exactly one inch, and a thickness in the direction of extension from said outer windshield surface of substantially exactly 1/16", said first strip being positioned with said longitudinal edges substantially parallel to said wiper blade in said initial position thereof and the longitudinal edge thereof nearest said blade positioned substantially exactly two inches from said initial position for contact with both of said longitudinal edges by said blade over substantially the full length thereof in both directions of motion on each cycle of reciprocating movement of said blade, said first strip having a constant, uniform, rectangularly shaped cross-sectional shape throughout its length such that the longitudinal, sharp edges of said first strip form abrupt 90° angles between adjoining surfaces of said first strip.

4,685,169
VEHICLE WASH AND DRYER

James A. Nelson, Des Moines, Iowa, assignor to Ryko Manufacturing Company, Grimes, Iowa

Filed Aug. 26, 1985, Ser. No. 769,666
Int. Cl.[4] B60S 3/06
U.S. Cl. 15—302 11 Claims



1. An apparatus for washing and drying an automotive vehicle comprising, in combination:

a gantry for moving along said vehicle;

water outlet means, mounted on said gantry, for wetting said vehicle;

dryer means, mounted on said gantry, for expelling air and removing moisture from said vehicle;

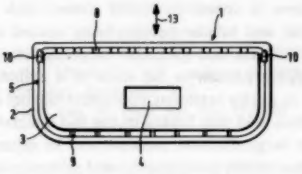
at least two nozzles on said dryer means, each of said nozzles defining an orientation and directing said air from said dryer means in a direction substantially parallel with said orientation; and

oscillation means, interconnected to said nozzles, for moving said orientation of each of two said nozzles to upper and lower positions and thereby moving said direction of said air from said dryer means, whereby air is directed to said vehicle to substantially dry the sides and top of said vehicle.

4,685,170
BRISTLE COMPONENT FOR A FLOOR CLEANING NOZZLE

Heinz-Jürgen Ahlf, Bergisch-Gladbach; Wieland Gühne, Remscheid; Hans-Peter Simm, Wuppertal, and Peter Wulf, Ennepetal, all of Fed. Rep. of Germany, assignors to Vorwerk & Co. Interholding GmbH, Wuppertal, Fed. Rep. of Germany

Filed Mar. 19, 1986, Ser. No. 841,177
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 8508144[U]
Int. Cl.[4] A47L 9/06
U.S. Cl. 15—367 4 Claims



1. A floor cleaning nozzle for attachment to vacuum generating means and adapted for movement over the floor in a predetermined direction such as next to a surface extending upwardly from the floor, the floor and the surface conjointly defining a corner wherein dust and the like can accumulate, the floor cleaning nozzle comprising:

a housing through which dust and the like is drawn from the floor by said vacuum generating means; said housing having a substantially quadrilateral peripheral edge facing toward the floor; and,

a bristle component for supporting the housing on the floor as it is moved therealong, said bristle component including:

a single bristle holding strip attached to said housing about the periphery thereof and having segments at the forward corners of said peripheral edge;

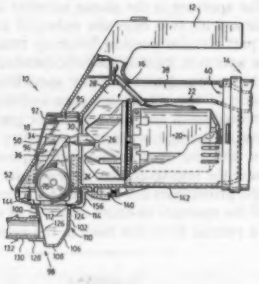
a plurality of downwardly extending first bristles tightly held by said holding strip along the length thereof for supporting said housing on the floor; and,

a plurality of second bristles extending downwardly substantially parallel to the adjacent ones of said first bristles also tightly held by said holding strip at only said segments and extending downwardly from said housing farther than said first bristles thereby permitting said second bristles to be bent by contact with the floor and extend outwardly from said housing transversely to said predetermined direction and into said corner to dislodge and sweep away said dust disposed therein when the nozzle is moved over the floor next to said surface.

4,685,171
GUIDE FOR A DRIVEN ENDLESS BELT

Laurent Beaudoin, Welland, Canada, assignor to Iona Appliances Inc., Welland, Canada

Filed May 8, 1986, Ser. No. 860,912
Int. Cl.[4] A47L 9/32
U.S. Cl. 15—391 4 Claims



1. In vacuum cleaner apparatus wherein an endless tensioned belt is adapted to be applied over and extend between a rotary beater element and the unsupported end of a motor-driven shaft or removed therefrom, with said belt being twisted to present two spaced apart reaches thereof with a first loop engaging over said rotary beater element and a second loop engaging over said unsupported end of said motor driven shaft in a position disposed inwardly thereof when said belt is driven by said shaft and displaced outwardly thereof from the aforesaid position of said second loop to disengage therefrom when said shaft is driven by said belt through reverse rotation of said beater element, a housing therefore including an internal suction passageway therein extending from said rotary beater element to said unsupported shaft end and enclosing said endless tensioned belt therewithin, said housing having an opening thereinto providing access to said suction passageway and to said second loop of said belt for applying same over said unsupported shaft end or removing same therefrom, and a removable closure element for closing said access opening during normal operation to complete said suction passageway, a bearing surface formation fixedly carried by said removable closure element to project inwardly therefrom into said suction passageway when said access opening is closed thereby, said bearing surface formation having an extent and configuration so as to occupy a region within said suction passageway between said shaft and said rotary beater element and in spaced apart relation outwardly of the position of at least one of said reaches of said endless tensioned belt when driven by said shaft

and to bear against said aforesaid reach of said belt only when displaced outwardly from said aforesaid position of said reach when said shaft is driven by said belt through reverse rotation of said beater element whereby further displacement from the position of engagement of said second loop applied over said unsupported end of said shaft is restrained.

4,685,172

BUSH SECURING MECHANISM

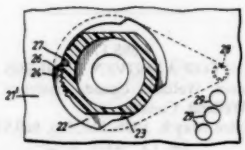
Dermot J. O'Connor, Ascot, England, assignor to Data Recording Instrument Company Limited, Staines, United Kingdom

Filed May 1, 1986, Ser. No. 858,204

Claims priority, application United Kingdom, May 7, 1985, 8511529

Int. Cl.[4] F16L *5/00, 57/00*

U.S. Cl. 16—2 **7 Claims**



1. A bush construction for location in an aperture in a planar member, the aperture in the planar member being of generally circular form with two opposite enlarged areas, the bush including a part circular portion for entry into the circular portion of the aperture, two oppositely directed lugs for passing through the enlarged areas of the aperture to extend on an opposite side of the planar member and a plurality of outwardly directed teeth extending from the part circular portion adjacent one of the lugs whereby upon entry of the part circular portion into the aperture and subsequent rotation of the bush to cause the lugs to engage the opposite side of the planar member, the projections are engaged by an end of a part circular edge of the aperture to cause removal of sufficient material to ensure a precise fit of the bush in the aperture.

4,685,173

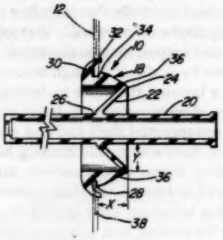
GROMMET WITH ANGULARLY POSITIONABLE TUBULAR PORTION

Carol P. Pavur, Warren, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Jul. 7, 1986, Ser. No. 882,650

Int. Cl.[4] F16L *5/00*

U.S. Cl. 16—2 **1 Claim**



1. A one-piece elastomeric grommet for passing one or more flexible elongated conduits through a panel circular opening in a vehicle passenger compartment, said grommet comprising a central tubular portion aligned on a longitudinal axis, a cylindrical outer rim portion having first and second longitudinal ends concentrically surrounding an intermediate length of said tubular portion, a laterally extending mounting flange on said rim portion first longitudinal end spaced from a laterally extending detent shoulder defining an annular groove therebetween for securing the grommet in the opening with the panel sealingly received between said mounting flange and said detent shoulder, and means connecting said rim portion and said tubular portion, the improvement wherein said tubular portion having an elongated hollow constant diameter cylindrical shape with first and second free ends, said tubular portion normally extending longitudinally such that its first end is positioned a predetermined minimal axial distance beyond said rim first end, said tubular portion having a central uniform passage normally aligned on said longitudinal axis adapted to receive the conduit therein, said rim portion formed with an interior cylindrical surface spaced outwardly from said tubular portion a predetermined radial distance substantially equal to said tubular portion diameter, said rim portion having a conical surface tapered inwardly at an acute angle of about 30 degrees from said detent shoulder to said rim portion second end, said connecting means in the form of a thin-walled resilient frustoconical web portion having a large diameter end and a small diameter end, said web portion large diameter end forming an integral large diameter juncture with said rim portion second end, said web portion small diameter end forming an integral small diameter juncture with the outer periphery of said tubular portion at a location intermediate its ends such that said small diameter juncture lies generally in the plane in which the panel lies when received in said annular groove, said large diameter juncture being spaced from said small diameter juncture a predetermined axial distance substantially equal to the radial distance between said large diameter juncture and said tubular portion outer periphery, said web portion providing controlled resilient deformation thereby allowing said tubular portion and the conduit routed therethrough to be cocked at various angles relative to the panel, said annular groove having an inclined base portion which normally extends from said detent shoulder toward said mounting flange at a predetermined upwardly inclined acute angle of the order of 15 degrees from the horizontal and wherein the external minimal diameter of said groove base portion is greater than the diameter of the panel circular opening by a predetermined amount, such that upon said grommet being inserted in the panel opening said annular groove base portion exerting a radially outward force thereby insuring sealing contact between said annular groove and the panel, whereby by virtue of said web portion large diameter juncture being positioned said predetermined axial distance from the panel said grommet maintains its rim portion annular groove in concentric sealed contact with the panel opening upon said tubular portion being cocked at various angles; and wherein said grommet integrally formed with a manual gripping portion in the form of a cylindrical skirt disposed in an axially extending concentric manner about said tubular portion, said skirt having its one end integral with said web portion large diameter juncture and its other free end formed with a radially extending lip, said skirt extending longitudinally toward said tubular portion second free end an axial distance substantially equal to the axial extent of said rim portion, and said tubular portion second free end positioned said predetermined minimal distance beyond said skirt free end, whereby said skirt is adapted for readily mounting said grommet in the panel opening by said skirt lip being grasped and pulled axially therethrough causing said grommet rim portion to shrink inwardly thus cooperating with said rim portion conical surface as said annular groove is captured in the panel opening.

4,685,174

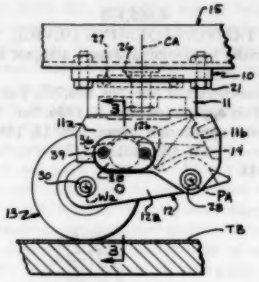
SHOCK ABSORBING CASTER WHEEL SUSPENSION WITH FRICTIONAL VERTICAL OSCILLATION DAMPENING

Clarence H. Hager, 3408 Corbridge La., Rockford, Ill. 61107

Filed Apr. 9, 1982, Ser. No. 366,825

Int. Cl.[4] B60B *33/00*

U.S. Cl. 16—44 **12 Claims**



1. A shock absorbing wheel suspension for supporting mobile equipment during movement over the ground and during transport on the bed of an over-the-road vehicle comprising, mounting bracket means, means for attaching the mounting bracket means to the mobile equipment, a wheel support bracket mounted on the mounting bracket means for vertical swinging movement relative thereto about a generally horizontal pivot axis, a ground engaging wheel, means mounting the ground engaging wheel on the wheel support bracket for rotation about a generally horizontal wheel axis parallel to the pivot axis, spring means engaging the wheel support bracket and the mounting bracket means resiliently urging the wheel support bracket in a direction to press the ground engaging wheel downwardly, characterized in that one of the items comprising the mounting bracket means and the wheel support bracket have a pair of oppositely facing wall surfaces disposed in planes generally perpendicular to said pivot axis and spaced radially outwardly therefrom, a pair of vibration dampening pads each having a pad face, and means mounting the pads on the other of the items with the pad faces at locations spaced outwardly of the pivot axis to slidably engage respective ones of the oppositely facing wall surfaces and with the pads pressed in a direction perpendicular to the respective pad face into pressurized frictional engagement with a respective wall surface to dampen vertical oscillation of the wheel support bracket relative to the mounting bracket and inhibit resonant vibration of the shock absorbing wheel suspension and the equipment supported thereon during transport on the bed of an over-the-road vehicle.

4,685,175

SPRING SYSTEM FOR DOUBLE-HUNG WINDOW SASH

John R. Yonovich, Shortsville, N.Y., assignor to Caldwell Manufacturing Company, Rochester, N.Y.

Filed Aug. 30, 1985, Ser. No. 771,350

Int. Cl.[4] E05F *1/08*

U.S. Cl. 16—197 **13 Claims**

1. A window spring subassembly for a double sash window system having guide rails formed in sash run regions of jamb liners, said subassembly comprising:

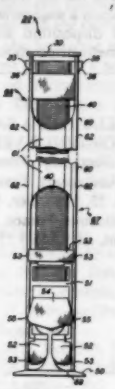
a. a spring, a spring cover, a spring anchorage, and a sash platform;

b. said spring cover substantially enclosing said spring and having a closed back side formed with opposite guide edges shaped to slide into an interlock with said guide rails;

c. an upper region of said back side of said spring cover being cut away to receive said spring anchorage connected to an upper region of said spring;

d. a lower region of said back side of said spring cover being cut away to receive said sash platform connected to a lower region of said spring and tensioning said spring between said anchorage and said platform; and

e. a cutaway lower region extending far enough above a



lower end of said spring cover so that said platform can move above said lower end of said spring cover to position said upper region of said spring above an upper end of said cover for attaching said anchorage to said spring.

4,685,176

SAFETY FASTENER

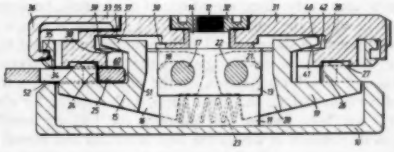
Martin B. Burnside, Pinner, England, assignor to Aircraft Materials Limited, Hertfordshire, England

Filed Jul. 18, 1986, Ser. No. 886,909

Claims priority, application United Kingdom, Jul. 22, 1985, 8518408

Int. Cl.[4] A44B *11/25*

U.S. Cl. 24—631 **10 Claims**



1. A safety fastener for a lug comprising a hollow body, a bolt pivotably mounted to the body within the body for movement between a lug-engaging latching disposition and a lug-releasing unlatching disposition, and biased to the latching disposition, an actuator assembly including a carrier mounted on the body for movement between a locking disposition and a release disposition, a manually-operable release means mounted on the carrier and movable in a different mode from the carrier from a rest disposition to a displacement disposition to drive the bolt against its bias from its latching to its unlatching disposition, and in the reverse direction to allow the bolt to return, the said movement of the release means being possible only when the carrier is in the release disposition, the carrier and the bolt being arranged so that the bolt cannot move to the unlatching disposition whilst the carrier is in its locking disposition, the actuator assembly including a bolt-blocking member movable, upon movement of the carrier from its locking disposition to its release disposition, from a retracted disposition to allow sufficient displacement of the bolt out of the latching disposition to enable it to engage the lug, to a bolt-obstructing disposition in which it prevents the said displacement of the bolt, thereby preventing engagement of the lug, the fastener

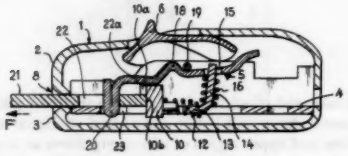
including restraining means to prevent movement of the release means from the rest disposition to the displacement disposition until the carrier has been moved to the release disposition, whereby release of the lug from engagement by the bolt is accomplished only upon a sequential movement of, first, the carrier to the release disposition and secondly the release means to the displacement disposition.

4,685,177

BUCKLE, ESPECIALLY FOR A SAFETY BELT FOR AN AUTOMOBILE VEHICLE

Gerard Escaravage, Valentigney, France, assignor to Aciers et Outillage Peugeot, Audincourt, France

Filed Jul. 15, 1986, Ser. No. 885,622
Claims priority, application France, Jul. 17, 1985, 85 10964
Int. Cl.[4] A44B *11/25*
U.S. Cl. 24—641 **13 Claims**



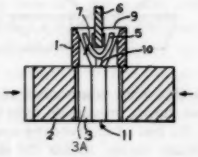
1. Buckle, especially for a safety belt for an automobile vehicle, intended to attach in a removable manner a length of the belt to a fixed point of the vehicle body, comprising a catch assembly and a belt (**21**) forming an integral part of the length to be attached, the catch assembly comprising, housed in a casing (**1**), a body (**4**; **30**) intended to be attached to a means of restraint forming an integral part of the vehicle and which defines a passage and a plane of sliding for the bolt, a member for locking (**5**; **37**) the bolt comprising an operating portion (**20**; **38**) which engages in a cavity (**22**) in the bolt in the position in which the latter is locked, and articulated to the body (**4**; **30**) so as to be capable of swinging around an articulation pivot (**19**; **36**) which is approximately parallel to the plane of sliding and perpendicular to the direction of travel of the bolt, between a position in which the bolt is locked and a position in which the bolt is unlocked, a sliding block (**10**) mounted in the said body so as to be capable of travelling along the direction of travel of the bolt and which cooperates, on the one hand, with a front face of the bolt and, on the other hand, with a spring for ejecting (**12**) the bolt, means (**16**) pushing the locking member towards its position in which the bolt is locked and means for producing unlocking (**6**) for moving the locking member (**5**; **37**) towards its position in which the bolt is unlocked, characterized in that said sliding block (**10**) is mounted so that it can travel between a forward position, in which a first bearing surface of the locking member (**5**; **37**) bears against this sliding block (**10**), corresponding to the position in which the bolt is unlocked, and a rear position, in which the locking member (**5**; **37**) has oscillated relative to the body (**4**; **30**) so that a second bearing surface of the locking member bears against the sliding block (**10**), corresponding to the position in which the bolt (**21**) is locked, in that the locking member (**5**; **37**) is in the form of metal blade comprising at one of its ends a locking projection (**20**; **38**) forming said operating portion of the former and cooperating, in a locking position, with a side of the cavity (**22**) in the bolt and with a stop edge in the body (**4**; **30**) to retain the bolt in a locking position, in its middle part an articulation surface cooperating with said articulation pivot (**9**; **36**) so as to enable said locking member (**5**; **37**) to travel and at its other end both a third bearing surface for the means (**16**) pushing the locking member towards its locking position and a fourth bearing surface (**17**; **39**) intended to cooperate with said means for producing unlocking (**6**) to move said locking member towards its unlocking position, and in that said third bearing surface consists of edges of a cavity (**15**; **40**) arranged in said locking member (**5**; **37**) and into which there projects one end of a tab (**14**; **31**) whose other end is an integral part of the body (**4**; **30**) and which extends approximately at a right angle to the body and on which is arranged a spring (**16**) forming the means pushing the locking member towards its locking position, one of whose ends bears on the body and the other on said third bearing surface of the locking member.

4,685,178

TAMPON-FORMING DEVICE

Takashi Nakanishi, Utsunomiya, Japan, assignor to Kao Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 698,707, Feb. 6, 1985, abandoned. This application Aug. 4, 1986, Ser. No. 893,017
Claims priority, application Japan, Feb. 15, 1984, 59-26707
Int. Cl.[4] A61F *13/20*
U.S. Cl. 28—118 **12 Claims**



1. A machine for manufacturing tampons, comprising: a plurality of stationary guide members arranged in a circular array around a central axis, the radially inner sides of said guide members being radially spaced from the central axis to define a tampon-forming zone therebetween, said zone being open at one end thereof, adjacent ones of said guide members having complementary curved side surfaces disposed in opposed circumferentially spaced relation to one another so as to define uniform, substantially radially extending, arcuate channels between said guide members, which channels converge toward the central axis; a plurality of arcuate press plates having pressing ends for forming a tampon by compression, said press plates being movably disposed in said channels for simultaneous pivotal movement about axes that are parallel with said central axis and in directions toward and away from said central axis for compressing material in said zone to form a tampon; means defining an inlet guide tube extending axially toward said one end of said tampon-forming zone for preforming tampon material to a substantially star-shaped cross-section and introducing said star-shaped cross-section tampon material into said zone for compression between said press plates, the internal diameter of said guide tube decreasing in a direction toward said zone, the inner wall of said guide tube having axially extending, circumferentially spaced apart grooves adapted for preforming said tampon material, said grooves being substantially axially aligned with the pressing ends of said press plates, wherein the grooves impart the inside of said inlet guide tube with said substantially star-shape in the region immediately above said tampon-forming zone; and a driving member for moving tampon material axially through said inlet guide tube into said zone between said press plates, each of said press plates remaining in constant contact with at least a portion of both of its associated complementary curved surfaces of said stationary guide members as said press plates move toward and away from said tampon-forming zone.

11. A machine for manufacturing tampons, comprising: a plurality if stationary guide members arranged in a circular array around a central axis, the radially inner sides of said guide members being radially spaced from the central axis to define a tampon-forming zone therebetween, said zone being open at one end thereof, adjacent ones of said guide members having complementary curved side surfaces disposed in opposed circumferentially spaced relation to one another so as to

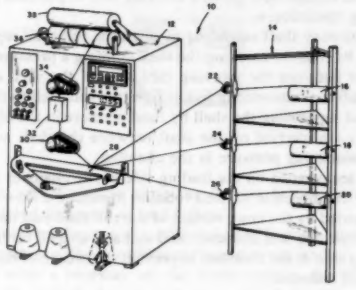
define uniform, substantially radially extending, arcuate channels between said guide members, which channels converge toward the central axis; a plurality of arcuate press plates having pressing ends for forming a tampon by compression, said press plates being movably disposed in said channels for simultaneous pivotal movement about axes that are parallel with said central axis in directions toward and away from said central axis for compressing material in said zone to form a tampon, an inlet guide tube extending axially away from said one end of said tampon-forming zone for introducing tampon material into said zone for compression between said press plates, the internal diameter of said guide tube decreasing in a direction toward said zone, the inner wall of said guide tube having indented axially extending, radially spaced apart grooves adapted for preforming said tampon material, said grooves being disposed in substantial axial alignment with the pressing ends of said press plates, and having U-shaped bottoms parallel to said central axis of said machine, wherein the grooves extend axially toward the tampon-forming zone from a line axially spaced a predetermined distance from said zone, said line being disposed where said bottom of said grooves meets the surface of the inner wall of said guide tube as the internal diameter of said guide tube increases in the direction away from said zone.

4,685,179

AIR PROCESSING APPARATUS

Richard W. Sheehan, Johnson City, and Kenneth A. Williford, Limestone, both of Tenn., assignors to World Tech Fibres, Inc., Johnson City, Tenn.

Filed Oct. 13, 1983, Ser. No. 541,556
Int. Cl.[4] D02G *1/16*; D02J *1/06, 1/08*
U.S. Cl. 28—248 **9 Claims**



1. An air processing apparatus for air entangling a plurality of strands of yarn comprising:

at least one feed roll for engaging and pulling the strands of yarn from a source and feeding the yarn at a feed rate;

means for guiding the strands of yarn into a side by side relationship on the feed roll;

feed motive means for rotatably driving said feed roll; an air entangler for receiving the strands of yarn from said feed roll and entangling the strands of yarn with a high pressure air stream;

at least one delivery roll for engaging and pulling the entangled yarn from said entangler at a delivery rate;

delivery motive means for rotatably driving said delivery roll independently from said feed roll;

a feed rate sensor for monitoring the feed rate of said feed roll;

a delivery rate sensor for monitoring the delivery rate of said delivery roll;

first display means responsive to said sensors for selectively displaying a ratio of the feed rate to the delivery rate;

second display means responsive to said sensors for selectively displaying the speed of said feed roll and delivery roll; and

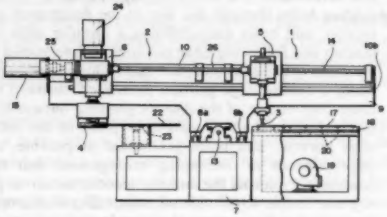
control means for independently controlling said feed motive means and said delivery motive means to independently vary the feed rate and the delivery rate of the yarn, and thus the ratio of the feed rate to the delivery rate, whereby a selected feed rate and a selected delivery rate may be chosen based on information from said first and second display means to achieve a desired overfeed or underfeed to produce a desired entangling effect on the yarn and to achieve a desired production rate.

4,685,180

CONTOUR SHAPING APPARATUS

Katsuhiko Kitaya, Meguro; Naohiro Iida, Hachioji; Atsushi Miyake, Kawasaki; Mitsuo Kobayashi, Shiga, and Akira Shirai, Higashiosaka, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Jul. 16, 1985, Ser. No. 755,773
Claims priority, application Japan, Jul. 19, 1984, 59-150172
Int. Cl.[4] B24B *7/00*
U.S. Cl. 29—33 R **25 Claims**



1. A contour shaping apparatus for cutting and grinding plate material comprising a first cutting work position and a second grinding work position; means for maintaining plate material in predetermined fixed orientations in the first and the second work positions during respective cutting and grinding thereof; the plate material being positioned, in turn, in the first and second work positions; the plate material fixed orientations being defined along orthogonal X and Y axes; means for cutting plate material in the first work position, the cutting means being movable along the X and Y axes over the plate material; control means operatively connected to the cutting means for guiding the cutting means along a predetermined contour on the plate material thereby effecting cutting of the plate material along the predetermined contour; means for grinding the edges of plate material in the second work position, the grinding means defining a first trace axis perpendicular to the X and Y axes; means for moving the grinding means along the X and Y axes in concidence with the cutting means whereby the grinding means trace axis traces the perimeter edge of a previously cut plate material in the grinding work position while the cutting means cuts plate material in the cutting position along the same predetermined contour; the grinding means includes a grinding head and means for spinning the grinding head about a grinding head axis, the grinding head axis being aligned generally perpendicularly to the X and Y axes and spaced from the grinding means trace axis an amount corresponding the radius of the grinding head at the point of grinding head contact with the plate material; means for rotating the grinding means about the trace axis; the rotating means operatively interconnected to the control means whereby a line passing through the center of the grinding head and the trace axis is maintained normal to the plate material edge while the trace axis is moved therealong.

4,685,181

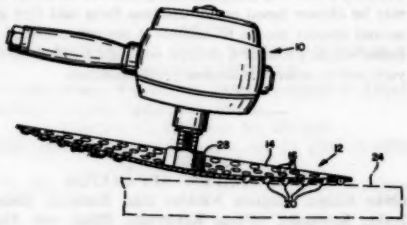
HEAVY DUTY ROTARY DISC RASP

Jerry C. Schwartz, 2020 NE. 140th, Seattle, Wash. 98125

Continuation-in-part of Ser. No. 511,560, Jul. 7, 1983, abandoned. This application Mar. 26, 1985, Ser. No. 717,643

Int. Cl.[4] B23D *71/00*

U.S. Cl. 29—78 **6 Claims**



5. A method for controllably removing wood from a wood work piece in a rasping operation which includes:

forming a rigid metal disc into a dish shape having an outer convex side, said disc adapted for rotation about a center axis in one circular direction, and having a designated annular section that is continuously curved from center to periphery, and said disc having sufficient thickness to be non-deformable in a wood rasping operation;

providing holes through the disc in the designated annular section, said holes each defining a circular edge having leading and following edge portions as determined by the direction of rotation, and each said following edge portion being a cutting edge portion protruded outward of said outer convex side of the disc progressing outwardly from the leading to the rearward most point of the following edge portion, said holes positioned to provide, cutting edge portions in overlaping arrangement and thereby continuously across the annular section, center to periphery, and further to provide corresponding visible openings through the disc across the annular section, center to periphery;

and further providing a combination of work piece illumination, arrangement of holes in the disc, and rotative speed for the disc whereby utilization of the disc in a wood rasping operation renders the annular section of the disc transparent to thereby enable viewing of the work piece during such operation.

4,685,182

IMPRESSION CYLINDER FOR COOPERATION WITH A PRINTING CYLINDER

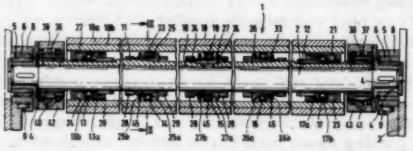
Herbert Lübke, Lienen, Fed. Rep. of Germany, assignor to Windmoller & Holscher, Lengerich, Fed. Rep. of Germany

Filed May 28, 1986, Ser. No. 867,537

Claims priority, application Fed. Rep. of Germany, May 28, 1985, 3519084

Int. Cl.[4] B21B *13/02;* **B30B** *3/04;* **B41F** *5/00*

U.S. Cl. 29—116 R **16 Claims**



1. A cylinder for cooperative engagement with an adjacent substantially parallel cylinder, comprising: (a) a hollow cylindrical shell; a stationary axle positioned within said shell, said axle having an external, axially extending groove; (b) a plurality of bearing means positioned in axially spaced relationship between said shell and said axle for freely rotatably supporting said shell on said axle, at least one of said bearing means including an annular member that is radially displaceable in order to deflect said shell radially outwardly relative to its axis at a point intermediate its ends; (c) at least one pressure-applying rod axially slidably mounted in said groove, said rod having an external, radially outwardly facing tapered surface that engages an inside surface of said annular member; and (d) displacement means carried on said axle for axially displacing said at least one pressure-applying rod within said groove and relative to said axle, to cause said tapered surface of said rod to move said annular member radially outwardly from said axle to deflect said shell radially outwardly to assume a bowed shape.

4,685,183

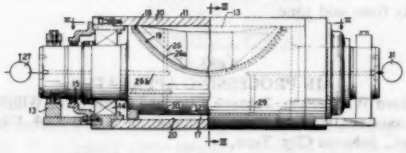
CONTROLLED DEFLECTION ROLL

Edgar J. Justus, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Jul. 27, 1984, Ser. No. 635,182

Int. Cl.[4] B21B *13/02*

U.S. Cl. 29—116 AD **16 Claims**



1. A controlled deflection roll comprising in combination:

a rotary tubular roll shell having an outer surface for pressure engagement along a working face to perform a pressing operation;

a stationary shaft extending through the roll shell supported at its ends for carrying the shell defining a pressure chamber between the working face area of the shell and the shaft for transmitting forces from the roll shell to the shaft and supporting the shell by fluid pressure in the chamber;

and a seal carried on the shaft between the shaft and shell maintaining pressure in the chamber;

said seal shaped on the leading side of the chamber relative to the direction of shell rotation to induce a flow of fluid carried by the inner surface of the roll shell past the seal to pressurize said chamber, and said seal shaped on the trailing side of the chamber to prevent the escape of fluid from said chamber.

4,685,184

SELF-LUBRICATED TRACK-ROLLER BEARING AND METHOD OF CONSTRUCTING THE SAME

Gary A. Satkamp, Valparaiso, Ind., assignor to McGill Manufacturing Company, Inc., Valparaiso, Ind.

Division of Ser. No. 653,480, Sep. 21, 1984, abandoned, which is a continuation-in-part of Ser. No. 332,505, Dec. 21, 1981, abandoned. This application Apr. 25, 1986, Ser. No. 857,980

Int. Cl.[4] B21D *53/10;* **B21K** *1/04*

U.S. Cl. 29—148.4 R **14 Claims**

1. In the manufacture of a self-lubricated track-roller bearing which comprises a cylindrical inner race ring with a cylindrical outside surface thereon and a cylindrical outer race ring with a cylindrical raceway on the inside surface thereof, the method for manufacturing said inner race ring with a self-lubricated fabric liner on said outside surface for engagement by said outer race ring cylindrical raceway when said track-roller bearing is operated in an installation, said method comprising:

(a) providing a self-lubricating fabric liner having adhesive on one side for bonding to the cylindrical outside surface

of said inner race ring and having self-lubricating material on the other side thereof;

(b) placing said liner on said outside surface of said inner race ring with the adhesive on said outside surface;

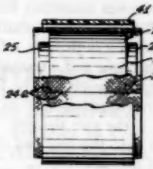
(c) providing a disposable assembly fixture comprising a tubular element of transparent heat shrinkable material having an original internal circular dimension greater than the outer circumferential dimension of said inner race ring and said liner on the outside surface thereof;

(d) positioning said disposable assembly fixture of transparent heat shrinkable material and said inner race ring with said liner thereon so that said fixture is completely around said liner and in a position when shrunken to press said entire liner inwardly and press said adhesive against said outside surface;

(e) applying heat to said disposable assembly fixture to shrink it into a more pressing contact with the complete circumference of said liner and over the width of said liner to cause said adhesive to be maintained in a tight adherence to said outside surface of said inner race ring;

(f) placing said inner race ring with said fixture thereon in an oven to heat the same and maximize the shrinkage of said fixture on said liner and to cure by heat said adhesive to securely bond said liner to said outside surface of said inner race ring; and

(g) removing said race ring with said liner and said fixture thereon from said oven and cutting such fixture on said



liner, and thereafter removing the cut fixture from said liner and disposing of said fixture.

7. In the manufacture of a self-lubricated bearing having an inner member with an outside surface thereon and an outer member with a raceway on the inside surface thereof, the method for manufacturing said inner member with a self-lubricated fabric liner on said outside surface for engagement by said raceway of said outer member when said bearing is operating in an installation thereof, wherein the improvement in said method comprises the steps of

(a) applying a self-lubricated liner having adhesive therewith to said outside surface of said inner member,

(b) placing a disposable assembly fixture comprising a length of heat shrinkable material around said liner on said inner member so that such heat shrinkable material covers said liner for the extent thereof as said liner is applied to said outside surface of said inner member,

(c) applying heat to said heat shrinkable material to shrink the same until said shrinking is maximized on said liner and said liner having adhesive therewith is secured to said outside surface of said inner member to provide an inner member assembly,

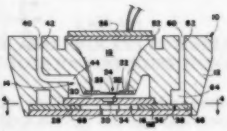
(d) and upon the completion of said securing of said liner to said outside surface of said inner member, removing said fixture of heat shrinkable material from said liner, and preparing said inner member assembly for assembly with said outer member to form a self-lubricated bearing.

4,685,185

METHOD OF MANUFACTURING AN INK JET HEAD

Brian Boso; Gerhard J. Beenen, both of Portland, and Bruce Murdock, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 29, 1986, Ser. No. 902,261
Int. Cl.[4] B21D *53/00*; B23K *9/16*
U.S. Cl. 29—157 C **17 Claims**



1. A method of manufacturing an aperture plate for an ink jet head, the aperture plate having first and second opposed surfaces, comprising:

micro electrical discharge machining the first surface of the aperture plate to form a recess of a first cross-sectional dimension in the first surface;

forming an aperture through the aperture plate between the first and second surfaces at the location of the recess, the aperture having a second cross-sectional dimension which is smaller than the first cross-sectional dimension of the recess.

5. A method of manufacturing an ink jet head of the type having a body which defines a horn compartment with first and second ends, a first plate mounted to the body when the ink jet head is assembled so as to close the first end of the horn compartment, the first plate having first and second opposed surfaces and a first aperture communicating between such surfaces, the first surface of the first plate bounding the horn compartment, a second plate mounted to the body when the ink jet head is assembled and having first and second opposed surfaces, the first surface of the second plate and second surface of the first plate defining an ink compartment therebetween which is in communication with the horn compartment through the first aperture, the second plate having a second ink drop-forming orifice passageway or second aperture communicating between the first and second surfaces of the second plate, the first and second apertures being coaxially aligned, comprising:

forming a first recess in the first surface of the first plate;

forming a recess in the first surface of the second plate;

mounting the first and second plates to the body;

forming the first and second apertures through the first and second plates and at the location of the recesses after the first and second plates are mounted to the body.

4,685,186

METHOD OF INSERTING A SLEEVE WITHIN A HEAT EXCHANGER TUBE

Raymond H. Glatthorn, St. Petersburg, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

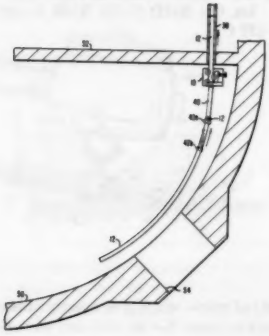
Continuation of Ser. No. 392,979, Jun. 28, 1982, abandoned.
This application Feb. 10, 1984, Ser. No. 578,591
Int. Cl.[4] B21D *53/06*
U.S. Cl. 29—157.4 **3 Claims**

1. A method of inserting a sleeve within a damaged heat exchanger tube of a steam generator where the tube entrance is within a chamber accessed through a manway and the geometry of the tube entrance, chamber and manway prevent direct insertion of a straight sleeve into the tube, the steps comprising:

performing a required length of the sleeve to a curved configuration;

arranging a tube straightening device within the chamber of the steam generator proximate a tube to be sleeved;

passing at least a portion of the preformed sleeve through the manway into the chamber;



placing an end of the preformed sleeve within a straightening device; and

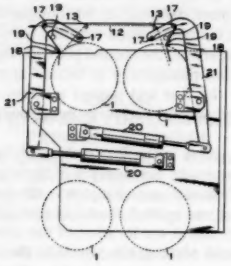
passing the sleeve through the straightening device to reform the sleeve to a straight configuration and inserting the straightened sleeve into the tube.

4,685,187

METHOD OF LOADING MAGNETIC RECORDING TAPE IN CASSETTE CASES

Toyohide Kubo, Tokushima, Japan, assignor to AWA Engineering Co., Ltd., Tokushima-ken, Japan

Filed Jul. 16, 1986, Ser. No. 886,661
Claims priority, application Japan, Jul. 22, 1985, 60-162606
Int. Cl.[4] B23P *11/00*
U.S. Cl. 29—434 **5 Claims**



1. A method of loading pairs of reels wound with magnetic recording tape into opened cassette case bases having a zigzag shaped tape track formed by guide pins, which comprises:

(a) holding the reel pairs from above;

(b) positioning tape wound on the reels to conform with the cassette's said zigzag shaped tape track by means of a plurality of positioning pins;

(c) maintaining the tape in the zigzag shape while lowering the reels and tape to the cassette case base;

(d) loading the reels and tape into the said cassette case base;

(e) locating said positioning pins such that they do not strike or contact the cassette case guide pins when they are lowered to said cassette case base;

(f) shaping, by means of said positioning pins, the tape wound on a reel pair to correspond to the cassette's said zigzag shaped tape track formed by cassette case guide pin gaps; and

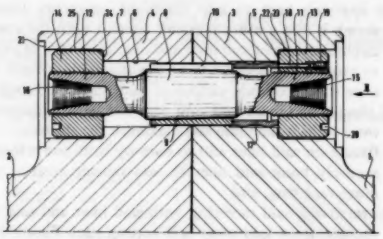
(g) maintaining the tape in the zigzag configuration while the tape and reel pair are lowered to, and loaded into said cassette case base.

4,685,188

METHOD OF COUPLING TWO FLANGED SHAFT ENDS

Pierre Goy, Sarcelles, France, assignor to Alsthom, Paris, France

Filed Feb. 24, 1986, Ser. No. 832,203
Int. Cl.[4] B23P *11/02*
U.S. Cl. 29—446 **1 Claim**



1. A method of coupling two flanged shafts end-to-end by means of cone-shaped taper pin bolts and longitudinally slit expansion sleeves having a cylindrical exterior and a cone-shaped interior cooperating with the pin bolts and having the same conicity, said sleeves extending into aligned cylindrical bores provided in flanges on said shafts and said pin bolts having external threads on both ends, a first end being located at the small end of the cone and a second end at the large end of the cone, said method involving the following steps:

(a) inserting each pin together with its sleeve into the corresponding bores of the two flanges,

(b) screwing a nut onto the first end of the pin bolt, nearest the small end of the taper,

(c) exerting a tractive force on the second end of the pin by means of a hydraulic or air cylinder, the nut on the first end bearing against the corresponding flange,

(d) while maintaining the tractive force on the second end of the pin, screwing a nut up on said second end to apply against that corresponding flange,

(e) and pushing the sleeve back toward said second end and terminating the tractive force of the cylinder on the second end of the pin bolt.

4,685,189

PLIABLE SLEEVE WHICH IS TURNED INSIDE OUT AND LUBRICATED WHEN FITTED ON A CORE AND METHOD OF INSTALLING SAME

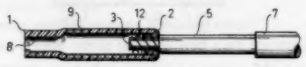
Lars I. Palmqvist, and Bolennart A. Svensson, both of Alingsås, Sweden, assignors to Kabeldon Aktiebolag, Alingsas, Sweden

PCT No. PCT/SE85/00256, § 371 Date Feb. 28, 1986, § 102(e) Date Feb. 28, 1986, PCT Pub. No. WO86/01047, PCT Pub. Date Feb. 13, 1986
PCT Filed Jun. 18, 1985, Ser. No. 851,133
Claims priority, application Sweden, Jul. 25, 1984, 8403849
Int. Cl.[4] B29C *63/22;* H02G *15/02;* H01B *17/58*
U.S. Cl. 29—450 **6 Claims**

1. An end piece construction for an elongated core comprising: a sleeve adapted for being mounted on an elongated core, said sleeve being made of a pliable, elastic material so as to be capable of being turned inside out, said sleeve having an initial state in preparation for insertion of a core within the sleeve, said sleeve in said initial state including an end portion turned inwardly into the remainder of the sleeve, and a quantity of lubricant within said sleeve adjacent said end portion, said

sleeve in said initial state having a surface facing inwardly which is provided with a plurality of hollows therein distributed over substantially the entirety thereof, said surface of said sleeve sliding on itself during insertion of a core while the sleeve is being entirely turned inside out, said sleeve, when turned inside out, having said surface which previously faced inwardly then facing outwardly, said hollows being dimensioned and located to take up said lubricant and carry it along as the sleeve is being turned inside out to provide lubrication for said surface as it slides on itself.

3. A method of installing a sleeve on an elongated core, said method comprising: providing a sleeve of pliable elastic material having an inner surface with a plurality of hollows therein



distributed over substantially the entirety thereof, said sleeve having an end portion turned inwardly into the remainder of the sleeve so that said inner surface forms the outer surface of said end portion, placing a quantity of lubricant in said sleeve adjacent said end portion, inserting an elongated core into said inwardly turned end portion of the sleeve, and advancing the core to cause the sleeve to be turned inside-out as the core is being inserted into the sleeve, said hollows taking up the lubricant in said sleeve and carrying the lubricant along as the sleeve is being turned inside out to facilitate the sliding of said inner surface on itself during insertion of the core in said sleeve, said inner surface of the sleeve sliding on itself as the sleeve is being turned inside-out and forming the outer surface of the sleeve when the sleeve is fully installed on the core.

4,685,190

METHOD OF OPERATING AN APPPARATUS FOR PRODUCING CONVEYER BELTS

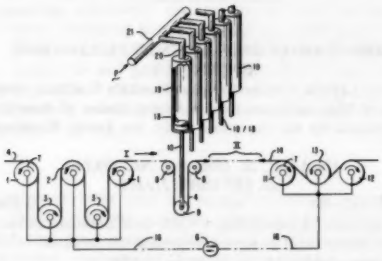
Hans Specht, Northeim, and Walter Käse, Hanover, both of Fed. Rep. of Germany, assignors to Continental Gummi-Werke Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Nov. 27, 1985, Ser. No. 802,862

Claims priority, application Fed. Rep. of Germany, Dec. 1, 1984, 3443889

Int. Cl.⁴ B65H *23/08*

U.S. Cl. 29—452 **3 Claims**



1. A method of operating an apparatus for producing conveyer belts of elastomeric material in which are embedded cord or wire-like load-carriers that extend parallel to one another in a longitudinal direction without contacting one another; said method including the steps of:

providing means for jointly keeping said load-carriers under tension in a tension state within a lengthy portion of said apparatus;

disposing a plurality of tensioning cylinders near an input area of said lengthy portion of said apparatus, with each of said tensioning cylinders having a piston that is displaced by pressure medium, and with each of said pistons having a piston rod;

providing each of said piston rods with a tensioning roller that engages a respective one of said load-carriers; and

applying a continously plusating pressure having a frequency between 5 Hz and 20 Hz, via said pressure medium, to said pistons of said tensioning cylinders so that always only a nominal sliding friction is present for said pistons in said cylinders, and so that greater binding static friction forces are avoided entirely.

4,685,191

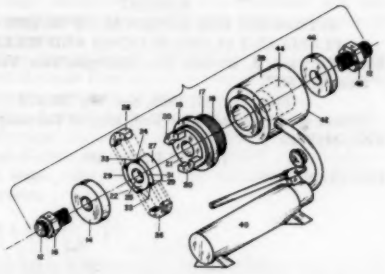
APPARATUS AND PROCESS FOR SELECTIVELY EXPANDING TO JOIN ONE TUBE INTO ANOTHER TUBE

Richard A. Mueller, and David L. Laughry, both of Tulsa, Okla., assignors to Cities Service Oil and Gas Corporation, Tulsa, Okla.

Filed May 12, 1986, Ser. No. 862,279

Int. Cl.⁴ B21D *39/00, 39/08, 22/10;* **B23P** *15/26*

U.S. Cl. 29—523 **37 Claims**



1. A process for joining at least one pair of tube means, or the like, by radially expanding a first tube means, or the like, into a second tube means in proximity to their respective ends to form an interference fit between the tube means comprising the following steps:

(a) placing a shaft means axially inside a first tube means, said shaft means having an inner cap means bound thereto for longitudinal axial movement in combination with the shaft means with respect to the first tube means;

(b) mounting a bushing means, including at least one generally open side which longitudinally traverse said bushing means, slidably on and along the shaft means for longitudinal axial movement on and along the shaft means with respect to the first tube means, said bushing means having at least one elastomeric means slidably lodged respectvely along the generally open side;

(c) mounting an outer cap means, including at least one prong means connected thereto, slidably on and along the shaft means for longitudinal axial movement on and along the shaft with respect to the first tube means such that said prong means is slidably lodged along the generally open side of said bushing means, said outer cap means structure whose outside surface defines a plurality of helical ridges and is positioned on the shaft means such that said elastomeric means is between said prong means and said inner cap means;

(d) mating threadably a ring means with the plurality of helical ridges on said outside of said outer cap means to permit the axial position adjustment of said elastomeric means;

(e) sizing an end sleeve segment means of the second tube means such that said end sleeve segment has a larger diameter than the first tube means;

(f) registering an end segment means of the first tube means,

which includes the elastomeric means therein, within the end sleeve segment means of the second tube means such that the inner surface means of the end sleeve segment means of the second tube means overlaps the end segment means outer surface of the first tube means; and

(g) pulling the shaft means in one axial direction while simultaneously pushing the outer cap means in the opposite axial direction such that when the inner cap means contacts the bushing means, and when the prong means connected to said outer cap means contacts the elastomeric means the continuing respective axial forces from pulling and pushing, in combination with the elastomeric means along the open side, compress and thereby radially expand the elastomeric means at predetermined selective locations against the end segment wall means of the first tube means causing radial expansion of the wall of the first tube end segment against the inner surface of the end sleeve segment means of the second tube means to form an interference fit therebetween.

4,685,192

APPLIANCE FOR REMOVAL OF BURRS ON FLAME-CUT SLABS; BLOOMS AND BILLETS

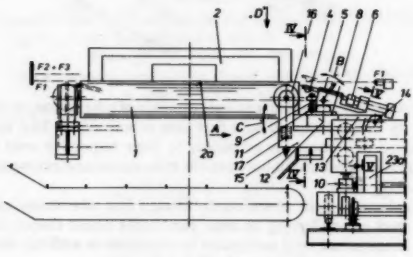
Ernst P. Braun, 3, Berliner Str., Dillingen/Saar, Fed. Rep. of Germany 6638

Filed Oct. 17, 1985, Ser. No. 788,472

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1984, 3438010

Int. Cl.[4] B21P *1/46*

U.S. Cl. 29—526.4 **18 Claims**



1. A burr cutting apparatus for removal of burrs on the surface of flame-cut slabs, blooms, billets and similar semi-finished products having a cutting tool adjustable in a vertical plane and movable relative to a semi-finished product and a cutting line, comprising:

a bearing block supported for raising and lowering thereof;

a cutting tool holder pivotably mounted on a horizontal axle on said bearing block for pivotal movement in a transverse direction relative to the product surface;

a flat chisel mounted on said cutting tool holder;

a pulsating drive means mounted on said cutting tool holder and operatively engageable with said flat chisel for driving said flat chisel in a pulsating manner;

a tapering chisel edge on said flat chisel;

resilient power means provided between said cutting tool holder and said bearing block for pivotally positioning said flat chisel at an angle relative to the product surface so that during operation raising said bearing block engages said chisel edge with and is continuously pressed against the product surface by the force of said resilient power means and increases said force; and

means to move said cutting tool holder and product relatively to each other and parallel to the cutting line.

4,685,193

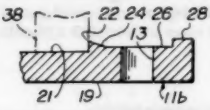
SEAL STRUCTURE FOR METAL VACUUM JOINT

Carl R. Faria, San Leandro, and Thomas W. Snouse, Fremont, both of Calif., assignors to Thermionics Laboratory, Inc., Hayward, Calif.

Division of Ser. No. 588,452, Mar. 12, 1984, Pat. No. 4,616,860. This application May 5, 1986, Ser. No. 859,704

Int. Cl.[4] B23P *13/00*; B23C *3/34*

U.S. Cl. 29—558 **6 Claims**



1. A method of forming a vacuum-tight joint structure comprising,

providing a pair of non-circular flange members each having an annular facing surface having inner and outer edges and a longitudinal axis,

milling in each said facing surface an outer groove having an outer shoulder parallel to said axis and having its bottom perpendicular to said axis,

milling in each said facing surface an upward-inward slanted surface having its bottom edge co-extensive with the bottom of said outer surface,

milling in each said facing surface an annular inner groove having an outer edge parallel to said axis,

said inner groove intersecting said slanted surface in a sharp corner spaced inward from said inner edge, said inner groove extending inward to said inner edge;

providing a pair of annular spacer rings each having an outside edge dimensioned equal to said outer shoulder and having a thickness sufficient to hold said facing surfaces apart when said spacer ring is placed in said outer groove,

placing one said spacer ring each said outer groove,

providing an annular soft metal gasket of substanially rectangular cross-section and having an outside diameter substanially equal to the inside diameter of said spacer ring,

placing said gasket between said flange members and between said sharp corners,

and drawing said flanges toward each other along said axis, said sharp corners digging into said gasket to seal said flanges together.

4,685,194

DIRECT MOAT SELF-ALIGNED FIELD OXIDE TECHNIQUE

James R. Cricchi, Catonsville, and Franklin C. Blaha, Arnold, both of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Oct. 21, 1985, Ser. No. 789,863

Int. Cl.[4] H01L *21/465*

U.S. Cl. 437—41 **5 Claims**

1. A process for fabricating a MOS semiconductor device on a silicon wafer, said process comprising the steps of:

forming a field oxide layer on said wafer;

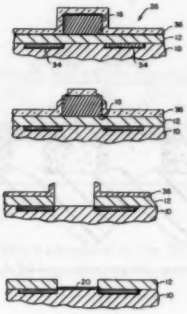
depositing a gate masking layer on said field oxide layer, said gate masking layer preventing the ion implantation of doping ions therethrough;

removing selectively portions of said gate masking layer, remaining portions of said gate masking layer vertically conforming to gate regions of said semiconductor device;

depositing a photoresist on said field oxide layer and on said remaining portions of said gate masking layer;

removing selectively portions of said photoresist, remaining portions of said photoresist forming an implant mask in cooperation with said remaining portion of said gate masking layer;

implanting dopants into said wafer, said implanting occuring in regions having no gate masking and no implant mask thereon;
removing said remaining portions of said photoresist;
depositing a secondary masking layer upon said field oxide layer and said gate masking layer, said second masking layer being of a matter not dissolvable in a chemical solution for dissolving said gate masking layer;
removing selectively portions of said secondary masking layer upon said gate masking layer by bias sputtering;
removing said remaining portion of said gate masking layer leaving said secondary masking layer that remains;
removing said field oxide layer exposed by removing said remaining portion of said gate masking layer to expose said gate regions;
removing said secondary masking layer;
forming a gate oxide layer in said gate regions;



depositing a drain/source photoresist layer on said field oxide layer and said gate oxide layer;
removing selectively portions of said drain/source photoresist;
removing said field oxide layer under said portions of said drain/source photoresist selectively removed whereby said regions of said wafer having implant are exposed;
removing said drain/source photoresist;
depositing on said field oxide layer, on said oxide gate layer and on said wafer an electrode layer;
depositing on said electrode layer a photoresist layer;
removing selectively said photoresist and said electrode layer, remaining portions of said electrode layer, forming electrical contacts on gate, drain and source regions; said contact on said gate region being said gate electrode;
removing said photoresist; and
electrically connecting said contacts to form said semiconductor device.

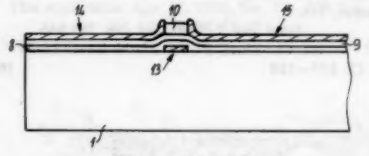
4,685,195

METHOD FOR THE MANUFACTURE OF AT LEAST ONE THIN FILM FIELD EFFECT TRANSISTOR

Nicolas Szydlo, Limours, and Francois Boulitrop, Sceaux, both of France, assignors to Thomson-CSF, Paris, France

Filed Jun. 11, 1985, Ser. No. 743,608
Claims priority, application France, Jun. 14, 1984, 84 09310
Int. Cl.[4] H01L *21/00, 29/78*
U.S. Cl. 437—41 **14 Claims**

1. A method for the manufacture of at least one thin film field effect transistor of the type having self-alignment of the electrodes, the transistor being obtained from successive deposits on a first face of a transparent, insulating substrate, wherein the method comprises the following stages:
first stage: deposits on the first face of the substrate of a first metal coating and a coating of a first material,
second stage: formation of a mesa of said first material,
third stage: deposition of a coating of a second material of given thickness,
fourth stage: etching said second material so as to only leave a first shoulder of the second material on the side or edge of the mesa,
fifth stage: etching the mesa until it has been completely eliminated,
sixth stage: etching the first metal coating so as to only leave a second metal shoulder protected by the first shoulder,
seventh stage: etching the first shoulder until it has been completely eliminated,



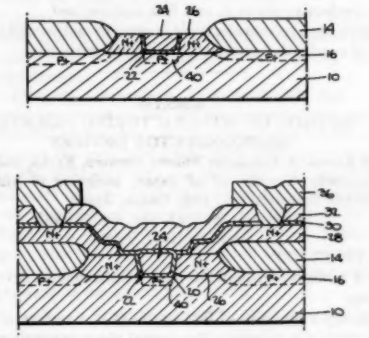
eighth stage: successive deposits of a transparent grid insulant coating and a thin coating of a transparent semiconductor material,
ninth stage: deposit of a photosensitive resin coating, irradiation of the resin from the second face of the substrate and elimination of the irradiated part of the resin,
tenth stage: formation of source and drain ohmic regions,
eleventh stage: deposit of a second metal coating and removal of resin and second metal coating on the resin,
twelfth stage: delimitation of the gate, source and drain electrodes.

4,685,196

METHOD FOR MAKING PLANAR FET HAVING GATE, SOURCE AND DRAIN IN THE SAME PLANE

Ming-Kwang Lee, Hsinchu, Taiwan, assignor to Industrial Technology Research Institute, Hsinchu, Taiwan

Filed Jul. 29, 1985, Ser. No. 760,129
Int. Cl.[4] H01L *21/263, 21/306, 7/36*
U.S. Cl. 437—41 **11 Claims**



1. A process for manufacturing an MOS transistor, comprising:
(a) forming a trench region in a monocrystalline semiconductor substrate of p- (or n-) type conductivity;
(b) forming a gate insulation layer of semiconductor oxide on the vertical and bottom surfaces of said trench region;
(c) depositing a gate element of semiconductor material on the gate insulation layer in said trench region so that said gate element substantially fills said trench region; and

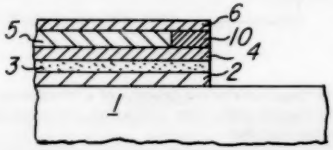
(d) forming source and drain elements on said substrate contiguous to the vertical surfaces of the gate insulation layer by doping said substrate, while simultaneously therewith doping said gate element, with an n- (or p-) type impurity; thereby forming an MOS transistor having source and drain elements in the same plane as the gate element.

4,685,197

FABRICATING A STACKED CAPACITOR

Howard L. Tigelaar, Allen, and Bert R. Riemenschneider, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 7, 1986, Ser. No. 781,846
Int. Cl.[4] H01L *27/10, 27/04;* G11C *11/34*
U.S. Cl. 437—195 **10 Claims**



1. A method for forming a capacitor comprising the steps of:
providing a first plurality of conductive plates interleaved but insulated from a second plurality of conductive plates;
masking a portion of said interleaved first and second pluralities of conductive plates;
etching said first plurality of conductive plates where said conductive plates are exposed by said mask;
filling the etched portion of said first plurality of conductive plates with a nonconductive material;
masking said plurality of first and second conductive plates to expose a second portion of said plurality of first and second conductive plates;
etching said second plurality of conductive plates where said conductive plates are exposed by said mask;
filling said etched portion of said second plurality of conductive plates with a nonconductive material;
providing a first electrical contact to said first plurality of conductive plates at said first portion; and
providing a second electrical contact to said second plurality of conductive plates at said second portion.

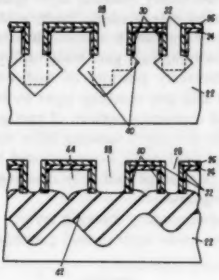
4,685,198

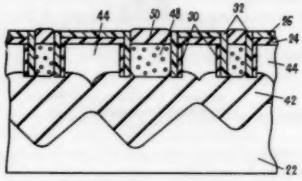
METHOD OF MANUFACTURING ISOLATED SEMICONDUCTOR DEVICES

Kenji Kawakita, Hirakata; Noboru Nomura, Kyoto, and Toyoki Takemoto, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 25, 1985, Ser. No. 758,962
Int. Cl.[4] H01L *29/06*
U.S. Cl. 437—73 **6 Claims**

1. A method of manufacturing a semiconductor device comprising:
forming a plurality of first openings in a surface of a semiconductor substrate, the crystal plane orientation of said semiconductor substrate being {100};
forming an oxidation resistant film on said surface of said semiconductor substrate and on part of the side walls of the first openings;
forming an etching resistant film on the bottom of said first openings;
exposing said semiconductor substrate at the side walls of said first openings by removing said oxidation resistant film on said part of said side walls;
forming second openings by orientation-dependent etching of the portion of said semiconductor substrate exposed at the side walls of said first openings;
forming oxide films in said second openings using said oxidation resistant film as a mask so that said oxide films are





buried into adjacent second openings and are connected to each other to define active regions of said semiconductor device; and
filling the first openings with an insulator material.

4,685,199

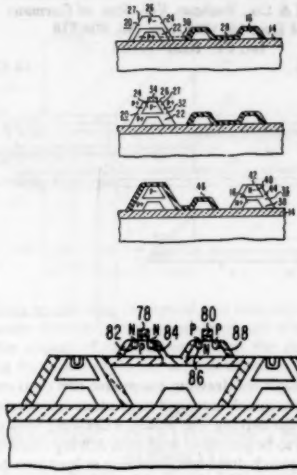
METHOD FOR FORMING DIELECTRICALLY ISOLATED PMOS, NMOS, PNP AND NPN TRANSISTORS ON A SILICON WAFER

Lubomir L. Jastrzebski, Plainsboro, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 29, 1986, Ser. No. 857,154
Int. Cl.[4] H01L *21/70*
U.S. Cl. 437—54 **15 Claims**

1. A method for forming dielectrically isolated PMOS, NMOS, PNP and NPN transistors on a silicon wafer, comprising:
(a) providing a silicon wafer having a substantially flat major surface with an insulator layer thereon and a plurality of monocrystalline silicon seeds on the insulator layer;
(b) forming a first monocrystalline silicon deposit on a first seed;
(c) forming a second monocrystalline silicon deposit on a second seed;
(d) covering the first deposit with an insulator layer;
(e) covering the second deposit with an insulator layer;
(f) forming a third monocrystalline silicon deposit on a third seed;
(g) forming an insulator layer on the top surface of the third deposit;
(h) forming first and second monocrystalline silicon islands on the insulator layer on the third deposit;
(i) forming a bipolar transistor in the first monocrystalline silicon deposit;

(j) forming a complementary bipolar transistor in the second monocrystallne silicon deposit; and



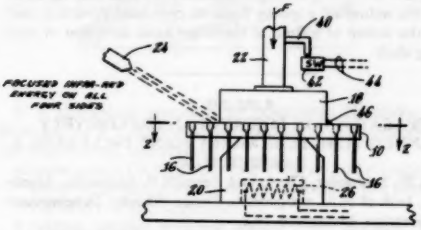
(k) forming an MOS transistor in the first island and a complementary MOS transistor in the second island.

4,685,200

LOW INTERNAL TEMPERATURE TECHNIQUE FOR HERMETIC SEALING OF MICROELECTRONIC ENCLOSURES

Delip R. Bokil, Winchester, Mass., assignor to Analog Devices, Incorporated, Norwood, Mass.

Filed Jan. 18, 1982, Ser. No. 340,279
Int. Cl.[4] H01L *21/58*
U.S. Cl. 437—215 **2 Claims**



1. The method of packaging temperature-sensitive microelectronic devices, including hybrid integrated circuits, supported on a rigid hermetic planar substrate, comprising the steps of:

applying a meltable hermetic sealing material to a closed path defined by the interface between said substrate and a hermetic box-like cover surrounding the region for said microelectric devices;

placing on said substrate said heremitic box-like cover having side walls aligned with and contacting said sealing material completely around said closed path;

applying line-focused infra-red radiation onto the portions of both said substrate and said cover which are immediately adjacent the interface therebetween for a time sufficient to melt said sealing material to provide for interaction thereof with said substrate and said cover;

sensing relative movement between said box-like cover and said substrate resulting from the melting of said sealing material; and

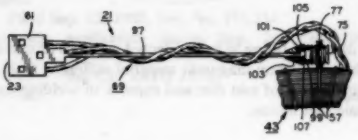
removing said application of infra-red radiation in response to a sensed predetermined extent of said relative movement.

4,685,201

METHOD OF ASSEMBLING A STATIONARY ASSEMBLY FOR A DYNAMOELECTRIC MACHINE

John H. Boyd, Jr., Holland, Mich., assignor to General Electric Company, Fort Wayne, Ind.

Division of Ser. No. 605,225, Apr. 30, 1984, Pat. No. 4,642,497.
This application Apr. 17, 1986, Ser. No. 853,266
Int. Cl.[4] H02K *15/00*
U.S. Cl. 29—596 **8 Claims**



2. A method of assembling a stationary assembly for a dynamoelectric machine, the stationary assembly including a core having a pair of opposite end faces with a plurality of winding receiving slots interposed therebetween, winding means for the core having a plurality of coils formed of a conductor material, each coil having at least one conductor loop with opposite side loop portions received in the slots of the core and with opposite end loop portions arranged in opposite generally annular groupings thereof adjacent the opposite end faces, respectively, and a set of lead ends integral with the winding means, respectively, a set of terminals, a plug member, a retaining member, and establishing means associated with said plug member and said retaining member for establishing a lost motion engagement therebetween so as to define a predetermined maximum distance between the plug member and the retaining member, the method comprising the steps of:

arranging the lead ends with respect to a first end loop grouping and extending the lead ends generally outwardly from a preselected part of the first end loop grouping beyond the outer circumference thereof;

cutting the lead ends to a preselected length predeterminately greater than the predetermined maximum distance between the plug member and the retaining member, respectively;

connecting the terminals to the cut lead ends; and

inserting the terminals into the plug member and mounting the retaining member with the stationary assembly at least adjacent the preselected part of the first end loop grouping, the difference between the preselected length of the lead ends and the predetermined maximum distance between the plug member and the retaining member being effective to at least in part prevent force transmission through the lead ends to the first end loop grouping in the event of the exertion of a force on the plug causing the operation of the establishing means.

4,685,202

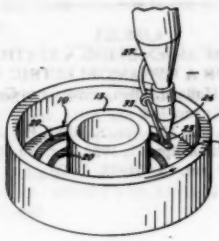
METHOD OF FORMING A COUPLING DISC FOR AN ELECTROMAGNETIC COUPLING

Dwight E. Booth, Janesville, and Michael L. Cory, Beloit, both of Wis., assignors to Dana Corporation, Toledo, Ohio

Filed Jan. 13, 1986, Ser. No. 818,217
Int. Cl.[4] H01F *41/02*
U.S. Cl. 29—607 **15 Claims**

1. A method of forming a multiple pole coupling disc for an electromagnetic coupling, said method comprising the steps of, providing a disc made of magnetic material, directing a laser

beam toward one face of said disc at a location between the center of the disc and the outer periphery thereof, effecting relative turning between said disc and said laser beam to cause said laser beam to heat said disc and form curved slot means in



the disc, and filling at least selected portions of said slot means with molten non-magnetic material different from the magnetic material of said disc and capable of welding to the edges of said slot means.

4,685,203

HYBRID INTEGRATED CIRCUIT SUBSTRATE AND METHOD OF MANUFACTURING THE SAME

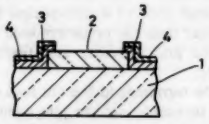
Mitsuyuki Takada; Yoshiyuki Morihiro, and Hayato Takasago, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 1, 1984, Ser. No. 636,675

Claims priority, application Japan, Sep. 13, 1983, 58-169702; Sep. 13, 1983, 58-169703

Int. Cl.[4] H01C *17/06*

U.S. Cl. 29—620 **10 Claims**



1. A method of manufacturing a hybrid integrated circuit substrate comprising the steps of:

preparing an insulating substrate;

forming cermet resistors on predetermined positions of said insulating substrate by firing;

forming activation layers for enabling deposition in electroless plating on said insulting substrate in contact with said resistors; and

forming conductor layers on said activation layers utilizing at least electroless plating, wherein said activation layers are made of activation paste containing a catalytic metal for enabling deposition in electroless plating and glass ingredients for attaining adhesion with said insulating substrate upon firing, electrical connection between said conductor layers and said cermet resistors occurring through said activation layers by ohmic contact effected between the cermet resistors and the conductor layers through diffusion layers formed upon firing the activation paste.

4,685,204

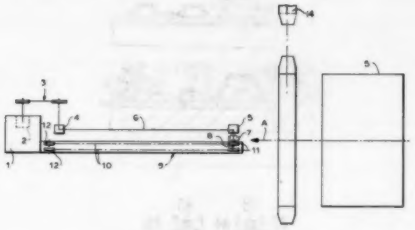
ARRANGEMENT FOR DRAWING TRANSVERSE RIBS

Heinrich Schulenberg, and Otto Wisse, both of Bochum, Fed. Rep. of Germany, assignors to GEA Luftkuehlergesellschaft Happel GmbH & Co., Bochum, Fed. Rep. of Germany

Filed Dec. 16, 1985, Ser. No. 809,518

Int. Cl.[4] B23P *21/00*

U.S. Cl. 29—726 **15 Claims**



1. An arrangement for drawing transverse ribs onto smooth pipes, comprising a punch arranged to produce transverse ribs; a drive provided for driving said punch; a drawing bank carrying smooth pipes to be provided with ribs; driving chain means movable by said punch drive and including at least two continuously rotatable endless driver chains extending at a distance from one another and driving the transverse ribs; driving chain wheels arranged for driving said driver chains at their one end and chain wheels arranged at the other end of the driver chains, said driving chain wheels having a driving shaft with an axis; and a coupling provided between said punch drive and said driving chain wheels at a drawing bank end which is opposite to said punch with said driving chain wheels spaced farther from said punch than said chain wheels at said other end, said coupling including two claw discs which are bringable in form-locking and force-transmitting engagement with one another, one of said claw discs being freely rotatably arranged on said driving shaft and at least indirectly actuatable from said punch drive, the other of said claw discs being connected with said driving shaft for joint rotation therewith, said other claw disc being axially displaceable on said driving shaft under the action of a spring force in one axial direction and under the action of a fluid in the other axial direction of said driving shaft.

4,685,205

APPARATUS FOR FORMING AN EXPLOSIVELY EXPANDED TUBE-TUBE SHEET JOINT INCLUDING A BARRIER TUBE

Joseph W. Schroeder, Clark, and Kawaljit S. Ahluwalia, Montville, both of N.J., assignors to Foster Wheeler Development Corporation, Livingston, N.J.

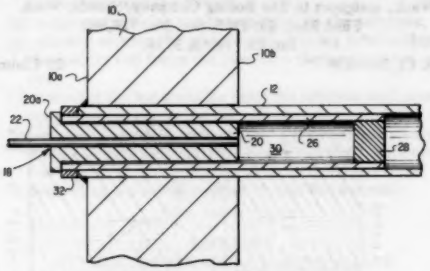
Filed Aug. 26, 1985, Ser. No. 768,997

Int. Cl.[4] B23P *15/26, 17/00*; B21D *53/00*

U.S. Cl. 29—727 **7 Claims**

1. Apparatus for expanding a tube into a bore formed in a tube sheet and extending from the outer surface to the inner surface thereof, said apparatus comprising a tubular force-transmitting member extending within said tube coextensive with the portion of the tube to be expanded, explosive means disposed in the bore of said force-transmitting member, said force-transmitting member and said explosive means extending flush with said inner surface of said tube sheet, a tubular barrier member extending between said force-transmitting member and said tube, means for locating said force-transmitting member and said barrier member relative to said outer surface of said tube sheet, a portion of said barrier member projecting from said inner surface of said tube sheet coextensive with a corresponding portion of said tube, and a plug disposed in the end of said projecting portion of said barrier member, said

plug, said force-transmitting member and said barrier member defining a chamber, said force-transmitting member and said barrier member being constructed and arranged so that they transmit the forces resulting from the explosion of said explo-



sive means to said tube to expand said tube into said bore, and said barrier member being constructed and arranged to withstand the impact of said forces so that the debris and gases resulting from said explosion are contained in said chamber.

4,685,206

POSITIONING APPARATUS FOR A CIRCULAR SUBSTRATE

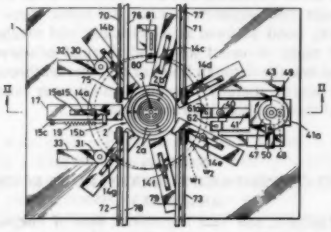
Jiro Kobayashi, Yamato, and Koichi Yoshikawa, Chiba, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Dec. 2, 1985, Ser. No. 803,437

Claims priority, application Japan, Dec. 5, 1984, 59-256922

Int. Cl.[4] B23P *19/00*

U.S. Cl. 29—740 **6 Claims**



1. A positioning apparatus for positioning a circular substrate having a V-shaped or U-shaped notch in a circumferential edge thereof, comprising:

rotation means for mounting said substrate and rotating said substrate around a center axis corresponding to a center of curvature of said substrate;

a pushing member arranged outside of the circumferential edge of said substrate in the same plane as said substrate and adapted to be fitted into said notch;

a notch sensor responsive to the notch of said substrate rotated by said rotation means;

means for stopping the rotation of said substrate in response to said notch sensor at a position at which the notch faces said pushing member;

means for moving said pushing member toward said center axis to displace said substrate along said plane by said pushing member acting through the notch of said substrate stopped by said rotation stopping means;

positioning means arranged to face said pushing member on the opposite side of said substrate in the same plane as said substrate mounted on said rotation means and adapted to abut against the circumferential edge of said substrate displaced by said pushing member to position said substrate; and

means for detecting the fitting of said pushing member in the notch of said substrate, said detecting means including discrimination means for discriminating a first status in which the pushing member is fitted in the notch and a second status in which said pushing member abuts against the circumferential edge of said substrate other than the notch, said discrimination means including a photo-electric detector arranged at a predetermined distance from said pushing member and movable with said pushing member for photo-electrically detecting the circumferential edge of said substrate to produce outputs of different levels for said first status and said second status.

4,685,207

DEVICE FOR PULLING UP SLIDER OF A SLIDE FASTENER CHAIN

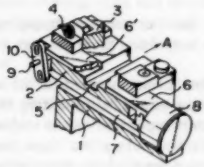
Yuusei Sassa, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

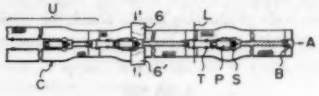
Filed Sep. 12, 1985, Ser. No. 775,234

Claims priority, application Japan, Sep. 20, 1984, 59-141537[U]

Int. Cl.[4] A41H *37/06*

U.S. Cl. 29—708 **3 Claims**





1. A device for pulling up a slider of a long slide fastener chain formed on a pair of longitudinally opposed tapes providing a plurality of sequential slide fastener units, comprising:

a chain guide having a passageway for allowing passage therethrough of the slide fastener chain having a slider slidably mounted thereon;

a pair of slider engaging fingers arranged to oppose each other from opposite sides of the passageway for being thrust into and withdrawn from said passageway; and

a finger actutating mechanism for positively thrusting said pair of fingers into the passageway and into restraining contact with a slider moving therethrough and then selectively positively withdrawing said pair of fingers from said passageway after a predetermined travel of chain.

4,685,208

APPARATUS FOR ASSEMBLING VEHICLE BODIES

Akira Sekiraku, Hiroshima, Japan, assignor to Mazda Motor Corporation, Japan

Filed Nov. 7, 1985, Ser. No. 795,889

Claims priority, application Japan, Nov. 15, 1984, 59-241458; Nov. 15, 1984, 59-241459; Nov. 15, 1984, 59-241460

Int. Cl.[4] B23P *21/00, 19/00*

U.S. Cl. 29—786 **9 Claims**

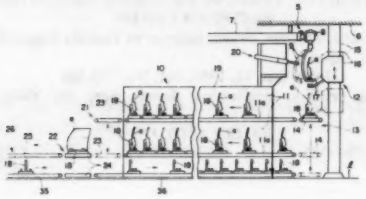
1. Apparatus for assembling vehicle bodies which is operative to detach doors from vehicle bodies conveyed into the apparatus after passing through a coating process and to mount various door parts and body parts on each of the doors detached from the vehicle bodies and each of the vehicle bodies

without doors, respectively, then to attach each of the doors provided with the door parts to the corresponding vehicle body provided with the body parts, the apparatus comprising:

first door conveying means for transporting the doors detached from the vehicle bodies,

door storing means for storing temporarily the doors transported by said first door conveying means,

door supplying means provided between said first door conveying means and said door storing means for receiving each of the doors transported by said first door conveying means with a supporting table member so as to support the same in a predetermined attitude on the supporting table member and for supplying the door supported on the supporting table member to said door storing means,



door assembly line means installed on the side of an exit of said door storing means for mounting the door parts on each of the doors supported on the respective supporting table members and forwarded from said door storing means after being temporarily stored therein, and

second door conveying means for transporting the doors each provided with the door parts from said door assembly line means to a door mounting station provided in a vehicle body production line to which the vehicle bodies each provided with the body parts are conveyed.

4,685,209

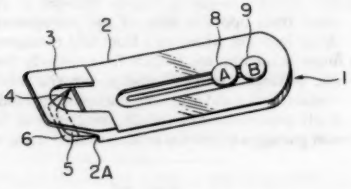
FILM PICKER FOR FILM CARTRIDGE

Hiroshi Takahashi, Atami, Japan, assignor to Nihon Jumbo Kabushiki Kaisha, Atami, Japan

Filed Dec. 19, 1985, Ser. No. 810,761

Int. Cl.[4] B23P *19/04*

U.S. Cl. 29—806 **8 Claims**



1. A film picker for a film cartridge, comprising a flat body having at an end a cartridge fixture adapted to be pressed against an outer surface of the film cartridge at an outlet of the film cartridge, and a thin elastic guide plate, extracting plate and film pressing plate extending from said end of the body in an overlapping manner with one another, wherein said guide plate and said extracting plate have a width which is substantially the same as that of film rewound within the cartridge, are individually movably held relative to the body and are coupled with associated actuation buttons, and said film pressing plate is fixedly secured to the body with an end being curved in a direction away from said cartridge fixture.

4,685,210

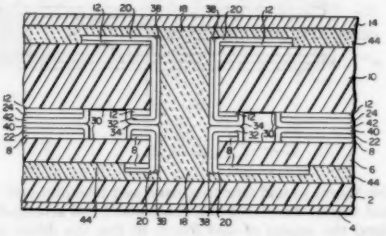
MULTI-LAYER CIRCUIT BOARD BONDING METHOD UTILIZING NOBLE METAL COATED SURFACES

Michael M. King, Vashon, and Helen J. Walter, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 13, 1985, Ser. No. 719,560

Int. Cl.[4] H05K *3/36*

U.S. Cl. 29—830 **25 Claims**



1. A method of forming an electrically and mechanically sound joint between internal layers of a multi-layer plated through hole printed circuit board comprising the steps of:

applying a coating of a noble metal to layer surfaces to be conductively joined on the through hole board layers;

juxtaposing the noble metal coated surfaces on the through hole board layers;

applying a layer of thermal adhesive over the outer surfaces of the juxtaposed through hole board layers;

juxtaposing imperforate outer board layers over the adhesive layers; and

exposing the juxtaposed layers to a pressure from about 100 psi to about 10,000 psi and a temperature from about 400 to about 1000 degrees F. until the noble metal coated surfaces bond to form an electrically and mechanically sound metal to metal joint and thermal adhesive is extruded into the through holes of the internal through hole board layers, thereby forming a multi-layer board with buried through hole interconnections.

4,685,211

METHOD OF PRODUCING A COOLED ELECTRONIC ASSEMBLY

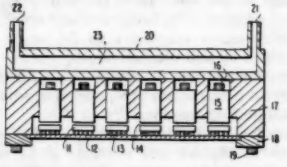
Takashi Hagihara, and Yuzi Kuramitsu, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Division of Ser. No. 764,278, Aug. 9, 1985, Pat. No. 4,628,990. This application Jul. 3, 1986, Ser. No. 882,115

Claims priority, application Japan, Aug. 17, 1984, 59-171059; May 28, 1985, 60-79540[U]

Int. Cl.[4] H05K *3/30;* F28F *7/00*

U.S. Cl. 29—832 **3 Claims**



1. A method of producing a cooled electronic assembly comprising the steps of:

(a) providing a substrate having mounted thereon a plurality of heat generating electronic components;

(b) providing a hat assembly which can be fixed to the substrate having therein cavities into which pistons having means for fixing their positions in the cavities have been slidably mounted, said cavities located so as to be adjacent

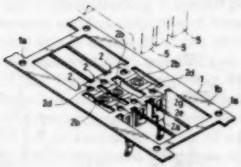
to said components when the substrate and hat assembly are joined;
(c) placing spacers on said electronic components corresponding to a desired gap distance between the electronic components and the pistons;
(d) temporarily fixing the hat assembly to the substrate;
(e) slidably moving the pistons into abutting relationship to the spacers and fixing the pistons in their respective cavities;
(f) removing the hat assembly from the substrate and removing the spacers;
(g) reassembling the hat assembly and the substrate whereby there is a gap between the pistons and the components; and
(h) providing a cooling medium to said hat assembly.

4,685,212

METHOD OF MANUFACTURING A JACK

Toru Masuda, and Yasuji Shibano, both of Osaka, Japan, assignors to Hosiden Electronics Co., Ltd, Japan

Filed Sep. 10, 1985, Ser. No. 774,619
Claims priority, application Japan, Sep. 29, 1984, 59-205153
Int. Cl.[4] H01R *43/00*
U.S. Cl. 29—876 **17 Claims**



1. A method of manufacturing a jack having a jack body including a plug insertion hole, side walls extending parallel thereto and a top side between the side walls, and a plurality of contact piece elements, comprising the steps of:
punching a strip of elastic, conductive sheet metal thereby forming a plurality of elastic contact piece elements which extend parallel to each other, form partial connections along their parallel extent and each have two ends;
bending both ends of each contact piece element downward;
positioning the jack body beneath the strip of sheet metal;
severing the contact piece elements at their partial connections thereby forming the plurality of contact piece elements into individual unconnected contact pieces; and
forcedly incorporating each individual piece into engagement with the jack body.

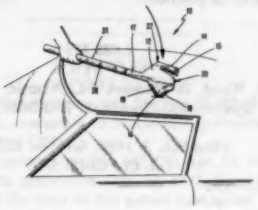
4,685,213

RESCUE AXE

Steven J. Powers, Chilhowie, Va., assignor to Fred R. Murray, Jr.; W. W. Guy and G. Arnold, all of Chilhowie, Va., part interest to each

Filed Aug. 7, 1985, Ser. No. 763,233
Int. Cl.[4] B25F *1/00*
U.S. Cl. 30—123 **18 Claims**

1. A rescue axe comprising:
(a) a single, one piece head portion located at one end of a handle member;
(b) said head portion including a piercing entry section, a cutting section, and an impacting section;
(c) the entry section including a metal piercing means on a first side of the head portion;
(d) the impacting section including a striking edge on a second side opposite the metal piercing means with said striking edge having two sides extending in respective directions which intersect each other at an angle greater than 90 degrees;
(e) the cutting section including a blade cutting edge extending rearwardly from an open mouth located on a third side of the head portion between said first side including the piercing means and said second, opposite side including the striking edge;



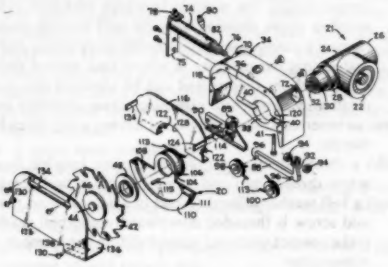
(f) said head portion including a blade member located between the blade cutting edge and the striking edge; and
(g) the handle member extends rearwardly from a side of the head portion opposite said third open mouth side of the head portion,
(h) the distance between any point on the blade cutting edge and any point on the striking edge is an amount sufficient to withstand blows on the striking edge and cutting pulls on the cutting edge while preventing the blade member from fracturing across said distance.

4,685,214

PROTECTIVE GUARD UNIT FOR METAL WORKING TOOL

Charles W. Shearon; Edward N. Berticevich, both of San Jose, and Ronald J. Billett, Sunnyvale, all of Calif., assignors to FMC Corporation, Chicago, Ill.

Filed Oct. 4, 1985, Ser. No. 784,132
Int. Cl.[4] B23D *45/00*
U.S. Cl. 30—391 **17 Claims**



1. A protective cutter guard unit for a hand held cutting tool having a motor which includes a motor housing and a drive shaft which is driven in response to gripping the motor housing and squeezing a motor trigger with one hand, the improvement which comprises:
means defining a cutting housing secured to said motor housing;
cutter means secured to said drive shaft and being partially encompassed within said cutter housing with an exposed portion projecting out of said housing;
means defining a cutter guard mounted for rotation on said motor housing between an extended position covering said exposed portion of said cutter means and a retracted

position uncovering said exposed portion of said cutter means;

control means operatively connected to said cutter guard for normally holding said cutter guard in said extended position, said control means being actuated to move said cutter guard to said retracted position only when the operator's other hand and fingers manually actuate said control means and grip a portion of said tool; and

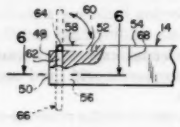
housing adjustment means for adjustably mounting said cutter housing on said motor housing in any one of a plurality of positions.

4,685,215

SLIP STICK

George N. Wood, 76 Flanders Rd., Niantic, Conn. 06357, and George Spector, 233 Broadway, RM 3615, New York, N.Y. 10007

Filed Feb. 3, 1986, Ser. No. 825,633
Int. Cl.[4] G01B *3/08*
U.S. Cl. 33—161 **1 Claim**



1. An extensible measuring tool for measuring lengths of lumber to be cut, said tool comprising:

(a) a first sliding bar member with a right to left scale;

(b) a second sliding bar member;

(c) guide means for guiding said first and said second sliding bar members together;

(d) means for locking said first and said second sliding bar members together; and

(e) a hook member mounted to distal end of said first sliding bar member so that said hook member can be placed on one end of said lumber to be cut; wherein said guide means is a U-shaped bracket mounted to proximal end of said second sliding bar member in which said first sliding bar member slides therein, wherein said locking means is a clamping screw assembly mounted to proximal end of said first sliding bar member in which said second sliding bar member slides therein and can be clamped into a locking position, wherein said clamping screw assembly includes;

(a) an inverted U-shaped bracket having a top threaded hole therein;

(b) a threaded clamping screw having knurled head, said screw threads into said threaded hole in said bracket; and

(c) a bell washer affixed to end of said screw so that when said screw is threaded downwardly said bell washer will make contact with said second sliding bar member; further comprising:

(a) an extension sliding bar member with a scale going left to right;

(b) means for guiding said extension and said second sliding bar members together; and

(c) means for locking said extension and said second sliding bar members together, wherein said second guide means is an inverted U-shaped bracket mounted to proximal end of said extension sliding bar member in which said second sliding bar member slides therein, wherein said second locking means is a second clamping screw assembly mounted near proximal end of said extension sliding bar member in which said second sliding bar member slides therein and can be clamped into a locking position, wherein said second clamping screw assembly includes:

(a) a second inverted U-shaped bracket having a top threaded hole therein;

(b) a second threaded clamping screw having a knurled head, said second screw threads into said threaded hole in said second bracket; and

(c) a second bell washer affixed to end of said second screw so that when said second screw is threaded downwardly said second bell washer will make contact with said second sliding bar member, in combination with removeable hook means at the distal end of said second bar, wherein said removeable hook means comprises:

(d) said second sliding bar member having a transverse passage forming a transverse track and a notch parallel to said second bar extending along the top of said distal end intersecting said passage;

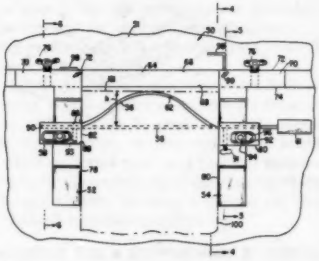
(e) a hinged stop being of two plates hinged therebetween so that one of said plates can be removeable positioned within said track and the other of said plates in said notch.

4,685,216

ARCH DOOR MARKING GAUGE

Timothy N. Woods, Rte. 3, Box 3160, Clayton, Ga. 30525, and Richard D. Frye, Dillard, Ga., assignors to Robert E. Garland, Mountain City and Timothy N. Woods, Clayton, both of, Ga.

Filed Jul. 2, 1986, Ser. No. 881,284
Int. Cl.[4] G01B *3/14*
U.S. Cl. 33—176 **14 Claims**



1. A cabinet maker's arch door marking tool comprising

a first side member adapted to be mounted on a support,

a second side member adapted to be mounted on the support in spaced relation to the first side member,

means on said first and second side members for locating a panel to be marked in a predetermined position relative to the side members,

means for securing said side members to the support in different spaced apart positions relative to each other, to accomodate, between said side members, a panel to be marked of a desired width,

a flexible band extending from said first side member to said second side member,

means on said first side member for holding a first length of said flexible band substantially perpendicular to a first side edge of the panel to be marked,

means on said second side member for holding a second length of said flexible band in alignment with said first length and substantially perpendicular to a second side edge of the panel to be marked, and

means for securing said band at different selected locations along its length with respect to at least one of said side members so that the length of the band between the side members can be varied to form symmetrical compound arches of different selected heights between said side members,

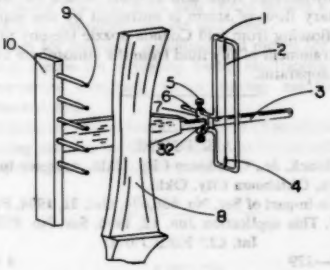
said flexible band comprising means for marking the contour of the arch formed by the band on the panel positioned between the side members.

4,685,217

ARCHERY

John M. Shader, 2008 SW. Pattulo Way, West Linn, Oreg. 97068

Filed Sep. 27, 1985, Ser. No. 780,992
Int. Cl.[4] F41G 1/46
U.S. Cl. 33—267 1 Claim



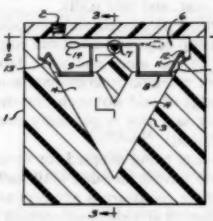
1. An archery sight for use with a bow having a cable guard bar and front sight reference points arranged in vertical array, said sight comprising a mounting block and a sighting window, said sighting window comprising a rectangular open frame formed from a single length of relatively thin diameter wire, the free ends of said frame extending in spaced parallel relation to each other, the sides and free ends of said frame being coplanar, a thin sighting line is mounted to the short sides of the open frame and extends vertically parallel and coplanar with the long sides of the frame; said mounting block having a mounting hole therethrough for adjustably mounting the block on said cable guard bar and means on said block for locking said block on said bar in various positions of adjustment; said block also having a pair of spaced apertures extending therethrough in a direction perpendicular to said hole with one aperture of said pair above and the other below the mounting hole, the free ends of said sighting window being adjustably fixed in said apertures by cap screws provided on said block, said sight and its mounting allowing substantially unobstructed alignment of said thin sighting line with the intended target and with the bows front sight reference points.

4,685,218

LEVEL SENSING UNIT AND A LEVEL INDICATING DEVICE BASED THEREON

Kenneth E. Wolf, 995 Sheridan, Wauconda, Ill. 60084

Filed Aug. 28, 1986, Ser. No. 901,384
Int. Cl.[4] G01C 9/06
U.S. Cl. 33—366 4 Claims



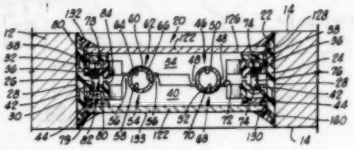
1. A level sensing unit comprising a sealed housing with a front and back wall, a top and bottom, and two side walls containing two communicably interconnected channels oriented from bottom to top as fluid reservoirs, each of said channels opening into a compartment containing an axle mounted between the front and back walls, said axle located between the two channels at a point above the opening of said channels, a float for each channel in electrical contact with and connected by pivotal means to the axle with the center of gravity of the float below the axle, each float having an electrically conductive extension in electrical contact with the axle and directed toward a strip of electrically conductive material mounted within the housing, said channels filled with a non-conducting unreactive fluid to a height such that when the housing is rotated around an axis passing from the front to the back wall there is some degree of rotation where the extension of each of the floats is engaged in electrical contact with the electrically conductive strip and where deviations on either side of said angle results in one float being buoyantly disengaged.

4,685,219

SPIRIT LEVEL

LeRoy H. Haefner, Edmond, and Stephen M. Rhodes, Mustang, both of Okla., assignors to Macklanburg-Duncan Company, Oklahoma City, Okla.

Continuation-in-part of Ser. No. 485,239, Apr. 15, 1983, Pat. No. 4,534,117. This application Aug. 12, 1985, Ser. No. 765,701
The portion of the term of this patent subsequent to Aug. 13, 2002, has been disclaimed.
Int. Cl.[4] G01C 9/28
U.S. Cl. 33—379 20 Claims



9. The spirit level comprising:
a frame having a hole therethrough;
a sleeve positioned within said hole, and bearing against the portion of said frame which surrounds and defines said hole, and having a central opening therethrough substantially coaxial with said frame hole;
a level vial having an operating position within said central opening of said sleeve; and
vial holding means removably and adjustably positionable in said sleeve and defining a central opening therethrough substantially coaxial with said frame hole for holding said level vial in said operating position, said vial holding means comprising a portion having a pair of vial engaging lugs and defining a curvilinear surface therebetween with an arc greater than 180° into which an end of said leveling vial is inserted.

13. A spirit level comprising:
a frame having a hole therethrough;
a sleeve positioned within said hole and having a central opening therethrough substantially coaxial with said frame hole;
a level vial having an operating position within said central opening of said sleeve; and
vial holding means positionable in said sleeve and defining a central opening therethrough substantially coaxial with said frame hole for holding said level vial in said operating position, said vial holding means comprising a portion having a pair of vial engaging lugs and defining a curvilinear surface therebetween with an arc greater than 180° into which an end of said level vial is inserted;
a transparent plate extending across said frame hole and facilitating viewing therethrough; and
plate retaining means for holding said plate in a position spaced from said vial, said retaining means comprising:
a tongue extending radially inwardly from an edge of said sleeve adjacent said transparent plate; and
a gasket comprising:

a surface engageable with a surface of said plate;

an outer portion defining a radially outwardly opening groove therein, said tongue and groove dimensionally conforming and being mutually engageable such that said gasket surface is maintained in retaining contact with said plate and prevents movement thereof away from said vial.

4,685,220

METHOD AND APPARATUS FOR SEPARATING DIOXIN FROM FLUIDIZABLE SOLIDS

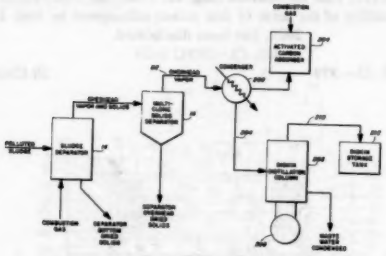
William C. Meenan, Waukegan, and George D. Sullivan, Glencoe, both of Ill., assignors to American Toxic Disposal Partners, Waukegan, Ill.

Filed Sep. 2, 1983, Ser. No. 528,910

The portion of the term of this patent subsequent to Aug. 7, 2001, has been disclaimed.

Int. Cl.[4] F26B *3/08*

U.S. Cl. 34—10 **40 Claims**



1. A method for treating a fluidizable solid material contaminated with a dioxin comprising:

heating said material by exposure to hot gas in a drying vessel at a temperature of from 850° to 2,500° F. thereby separating the dioxin from the material; and

conveying said separated dioxin out of said drying means for further treatment.

4,685,221

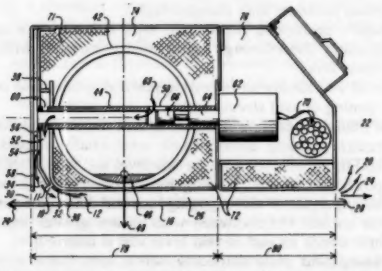
STEAM-SHOWER APPARATUS AND METHOD OF USING SAME

Bruce F. Taylor, Auburn, Mass., and Kenneth G. Hagen, Cape Elizabeth, Me., assignors to Thermo Electron - Web Systems, Inc., Auburn, Mass.

Filed Feb. 28, 1986, Ser. No. 834,957

Int. Cl.[4] F26B *13/02*

U.S. Cl. 34—155 **18 Claims**



1. An apparatus for applying a flow of steam to a sheet for the purpose of heating the sheet which runs parallel to a surface of the apparatus adjacent the sheet, the apparatus comprising:

means for creatin a supply of steam;

a Coanda nozzle positioned within the apparatus to receive a supply of steam and to cause the steam to flow parallel both to the adjacent surface of said apparatus and to said sheet, said flow of steam travelling in a direction opposite to the direction of travel of the sheet;

means for provide steam from said supply to said Coanda nozzle;

means for delivering a secondary supply of steam to a location downstream from said Coanda nozzle so that said secondary flow of steam is entrained by the supply of steam flowing from said Coanda nozzle thereby preventing entrainment of any fluid from the atmosphere external to the apparatus.

4,685,222

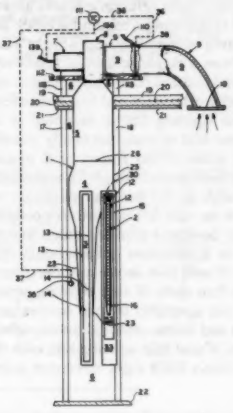
AIR TOWEL

Jasper C. Houck, Jr., Oklahoma City, Okla., assignor to Glenn M. Houck, Oklahoma City, Okla.

Continuation-in-part of Ser. No. 666,674, Oct. 31, 1984, Pat. No. 4,594,797. This application Jun. 12, 1986, Ser. No. 873,546

Int. Cl.[4] F26B *19/00*

U.S. Cl. 34—229 **4 Claims**



1. A device for providing heated air for drying, comprising:

an inner enclosure;

means for supplying air to said inner enclosure;

means for electrically heating the air supplied to said inner enclosure by said air supplying means;

said inner enclosure having a top edge in communication with said air supplying means; and said inner enclosure having front, rear, and side walls;

a generally vertical elongated slot provided in said front wall having a top edge and a bottom edge;

said side walls of the inner enclosure tapering generally smoothly from a region intermediate said top edge and said bottom edge of said slot such that the air velocity of the air leaving said slot is generally uniform along the length of said slot;

said inner enclosure being adapted for mounting within an outer enclosure having an outer wall such that said front wall of said inner enclosure is adjacent said outer wall;

said outer wall having an elongated opening therein communicating with said elongated slot; said outer wall having an interior surface and an exposed surface; a portion of said front wall of said inner enclosure being mounted adjacent said interior surface of said outer wall;

a flexible hose having opposite ends, one of said ends communicating with said inner enclosure for supplying air through said hose and the other of said ends having nozzle means such that said hose is manipulatable for selectively directing the air flowing through said nozzle;

said front wall of said inner enclosure having an upstanding flange fixed to said inner enclosure and penetrating said elongated opening in said outer wall;

said flange extending across and covering said elongated opening, said flange having a recess adapted to receive said flexible hose for at least partially encasing said hose, wherein said recess comprises a rear wall, and side walls adjacent said rear wall, said recess having a depth sufficient to completely encase said hose;

a means for manually actuating said means for heating air; said means for actuating being electrically isolated to prevented electrical shock during manual actuation thereof; and

said inner enclosure being composed of an electrically insulating material such that said means for actuating and said inner enclosure are shockproof.

4,685,223

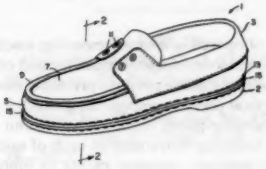
CALIFORNIA-TYPE SHOE

Gordon K. Long, 25 Shady La., Merrimack, N.H. 03054

Filed Oct. 15, 1985, Ser. No. 787,786

Int. Cl.[4] A43B *9/10, 9/02, 3/14*

U.S. Cl. 36—16 **16 Claims**



1. A hand sewn shoe comprising,

an upper having a folded over edge,

a sole having a stitching edge and a lateral stitching groove running parallel to the stitching edge,

and indentations which pass part way between the stitching edge and the stitching groove, wherein the folded-over edge is stitched directly to the stitching edge and the stitching passes through the indentations.

4,685,224

INSOLE

Wolfgang Anger, Hellwiesen 5, D-3002 Wedemark 9, Fed. Rep. of Germany

Filed Jul. 12, 1985, Ser. No. 754,646

Int. Cl.[4] A43B *17/03, 07/06*

U.S. Cl. 36—43 **16 Claims**

1. An insole comprising a continuous portion of substantially uniform thickness having formed on the underside thereof a plurality of projecting ribs arranged so as to oppose bending of said continuous portion, said ribs being uniformly spaced from and at angles to one another and arranged so as to form a labyrinth-like, non-straight, continuous air conveying channel between said continuous portion and the top-sole of a shoe when said insole is positioned within the shoe, said channel being open at the edges of said continuous portion and said ribs

pumping air through said channel and past the edges of said continuous portion.

4,685,225

SKI BOOT

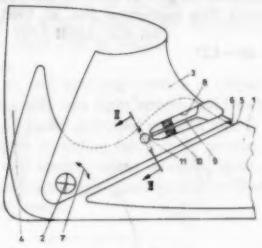
Adolf Heasler, Köflach, Fed. Rep. of Germany, assignor to Koflach Sportgerate Gesellschaft, Vienna, Austria

Filed Nov. 25, 1985, Ser. No. 802,208

Claims priority, application Austria, Nov. 23, 1984, 3717/84

Int. Cl.[4] A43B *5/04*

U.S. Cl. 36—117 **20 Claims**



1. Ski boot comprising a shell **(1)** consisting of synthetic plastics material and a cuff **(3)**, respectively, being swivellable relative to the shell and engaging, when being swivelled in direction to the boot tip, with its end portion **(6)** facing the boot tip, the shell **(1)**, and the cuff **(3)**, respectively, comprising at least one of a slot and a recess **(8, 25)** extending transversely relative to the longitudinal direction of the boot, characterized in that a front end of the cuff **(3)** shall always engage a protrusion **(5)** of the shell **(1)**, carrier elements **(9, 26, 31, 32, 39)** in particular inserts having rubber-elastic properties, are inserted into one of the slot and the recess **(8, 25)** and in that rigid supporting elements **(10, 13, 16, 17, 19, 22, 23, 27, 33, 37, 40)** can be inserted into this one of the slot and the recess **(8, 25)** and be fixed in their position.

4,685,226

SKI BOOT HAVING AN OPENING QUARTER FORMED OF MORE INTERCONNECTED PARTS

Icaro Olivieri, Westmount-Montreal, Canada, and Leo Sartor, Caerano, Italy, assignors to Caber Italia S.p.A., Montebelluna, Italy

Filed Mar. 6, 1984, Ser. No. 586,601
Claims priority, application Italy, Mar. 17, 1983, 41539 A/83
Int. Cl.[4] A43B *5/04*
U.S. Cl. 36—120 8 Claims

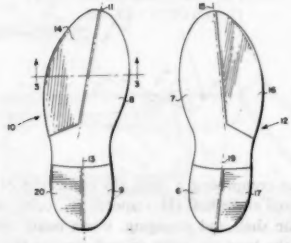
1. A ski boot structure comprising a shell with a sole part and an upper part with an instep zone, an openable quarter on said shell, said quarter has a rear part and a front part mutually complementary and arranged to slightly overlap each other when closed, said rear part is hingedly connected to said shell, said front part is hingedly connected to said rear part at an eccentric location relatively to the hinge point of said rear part of said shell, a cuff-like member enclosing the front of said shell, an adjustable link member attached at said rear part and at said cuff-like member to move said cuff-like member contemporaneously with said rear part, at least a stud attached to said shell, a shank ortogonally protruding from said stud, said shank being positionable turning said stud, at least a slot cam arranged to slide along said shank for guiding said front part actuated by the movement of said rear part.

4,685,227

GOLF SHOES

Ronald G. Simmons, Rte. 8, Box 224, Russellville, Ala. 35653

Continuation-in-part of Ser. No. 824,451, Mar. 18, 1986, abandoned. This application Jun. 30, 1986, Ser. No. 880,284
Int. Cl.[4] A43B *5/00*
U.S. Cl. 36—127 4 Claims



1. In a golf shoe to be used in pairs having uppers and a sole and heel, the improvement for controlling the stance, balance and shift of weight of a golfer during a golf swing comprising:

a thickened portion of said sole having a maximum thickness at the outer edge thereof adjacent the ball of the foot area of said sole and tapering laterally to zero thickness along a medial axis of said sole and to zero thickness longitudinally at the toe and instep areas of said sole; and

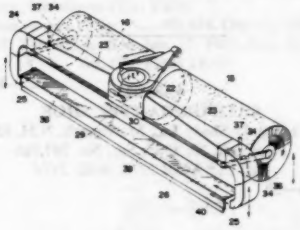
a thickened portion of said heel having a maximum thickness at the outer edge thereof and tapering laterally to zero thickness along a medial axis of said heel, said sole medial axis being inclined inwardly with respect to said heel medial axis.

4,685,228

SNOW-REMOVING MACHINE

Hans Gisler, Bern, and Marcel Boschung, Schmitten, both of Switzerland, assignors to Reberle reg. Treuunternehmen Schaan, Schaan, Liechtenstein

Filed Jan. 17, 1986, Ser. No. 820,264
Claims priority, application Switzerland, Jan. 23, 1985, 297/85
Int. Cl.[4] E01H *5/00, 1/02*
U.S. Cl. 37—197 5 Claims



5. A method of operating a snow-removing machine having a raisable and lowerable sweeping brush formed of a plurality of individual sweeping brush portions pivotable relative to one another in a vertical plane to engage the ground, a plurality of double-acting cylinder-piston units, a separate unit controlling the raising and lowering movement of each of said individual sweeping brush portions, common means to supply pressure fluid to all of said units to actuate all of said units to raise and lower said plurality of brush portions, and counterpressure means in each of said plurality of units for causing the piston of said cylinder-piston unit to be impinged upon by pressure opposing the actuation of the unit by said pressure fluid, comprising the steps of:

when raising the portion, adjusting the pressure of the pressure fluid supply in each unit to apply to the piston of the cylinder-piston unit a pressure corresponding to the weight of the individual sweeping brush portion in the direction for raising the sweeping brush portion, and

when lowering the portion, applying pressure fluid from the common means to one side of the piston in the cylinder-piston unit for lowering each portion, and applying to the opposite side of the piston a pressure fluid providing a counterpressure corresponding to the weight of the individual brush portion so that the pressure fluid applied for the purpose of lowering the sweeping brush portions provides the desired pressure on the ground.

4,685,229

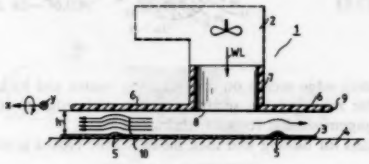
AIR CUSHIONED SUPPORT SOLE PLATE

Peter Moravek, Oberursel; Bernd Trebitz, Königstein; Albrecht Weller, Steinbach, and Klaus Amsel, Oberursel, all of Fed. Rep. of Germany, assignors to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,380
Claims priority, application Fed. Rep. of Germany, May 22, 1985, 3518425
Int. Cl.[4] D06F *75/30, 75/38*
U.S. Cl. 38—84 16 Claims

1. An ironing device for ironing a textile material placed on a base support for use with a hair dryer that provides an air stream that is generated by a fan in the hair dryer and is directed via a duct,

said ironing device including soleplate structure with at least one discharge port in said soleplate structure, connecting structure for attachment to the hair dryer so that the hair dryer duct is in communication with said discharge port in the soleplate and the air stream generated by the hair dryer fan flows through the duct is exhausted through said discharge port, and marginal bead structure at the periphery of said soleplate structure, the accumulated pressure



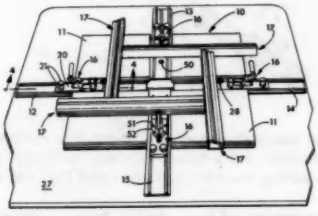
of the air stream beneath the soleplate being sufficient to develop a large-surface air cushion between the soleplate and the textile material placed on the base support, said air cushion lifting the ironing device from the textile material and supporting it during the ironing process and the dimensions of said soleplate and the location of said discharge port thereon are such that the lifting forces originating from said air cushion neutralize any tilting moments caused by the rotation of said fan.

4,685,230

ADJUSTABLE BIAXIAL STRETCHER

William H. Mason, III, 902 Goodrich Ave., St. Paul, Minn. 55105

Filed Jun. 20, 1986, Ser. No. 876,980
Int. Cl.[4] D06C *3/08*
U.S. Cl. 38—102.5 **20 Claims**



1. An adjustable stretcher device for positioning and holding frame structures of various dimensions and for biaxially tensioning a screen fabric across the frame structures, said adjustable stretcher comprising:

(a) a generally flat base member for supporting the remaining elements of the device,

(b) a pair of elongated opposing and perpendicularly disposed track members for securement to said base member, said track members having securement means to fasten said track members to said base member in a generally radial position from the center of said base member, each said track member further having an internally disposed sliding groove along its length,

(c) a clamping member for slidingly engaging each said track member, each said clamping members having a sliding plate body for slidably engaging said internally disposed groove members of said track members and having an adjustable set screw means, a handle member, an elongated connector shaft in communication with said handle member and a shaft support cylinder mounted to said sliding plate body, each said connector shaft further having a widened end portion, and

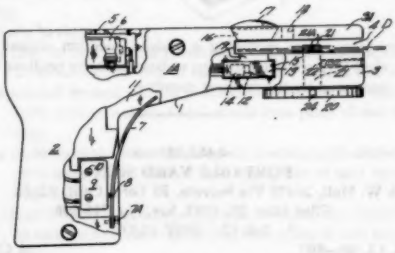
(d) an elongated stretcher module body having a body member, and further having a longitudinally extending channel member for slidingly receiving the widened end portion of said connector shaft, whereby the movement of the clamping members on said track members, the movement of said stretcher module body on said widened end portion of said connector shaft and the movement of the handle member of said clamping member permits a user to adjust the tension of screen fabric material biaxially across a frame structure placed within the adjustable perimeter of said elongated stretcher module bodies.

4,685,231

PHOTOGRAPHIC DISC VIEWER

Donnamae J. Brown, 90361 Shadows Dr., Springfield, Oreg. 97478

Filed Sep. 16, 1985, Ser. No. 776,566
Int. Cl.[4] G02B *27/02*
U.S. Cl. 40—366 **5 Claims**



1. A device for viewing photographic transparent images annularly disposed upon a disc, said device comprising,

a main body defining a horizontal open area for receiving the disc and having a handgrip portion,

turntable means including a post offset from said handgrip portion and on which the disc may be placed.

a light source disposed within said main body below the horizontal open area,

a magnifier lens disposed above main body open area through which may be viewed a disc photographic image,

means permitting viewing of the disc and particularly an annular area on which numbers are displayed with each number associated with an image.

a power source,

switch means on said handgrip portion in circuit with said power source and said light source, said switch means including a manually activated control, and

an electric circuit including said power source, said light source and said switch means whereby upon closure of said switch means the light source provides illumination to a disc carried image.

4,685,232

INDEX DEVICE

Chuzo Mori, Funabashi, Japan, assignor to Carl Manufacturing Co., Ltd., Tokyo, Japan

Filed Sep. 10, 1985, Ser. No. 774,501
Int. Cl.[4] B42F *17/34*
U.S. Cl. 40—381 **7 Claims**

1. An indexing device comprising:

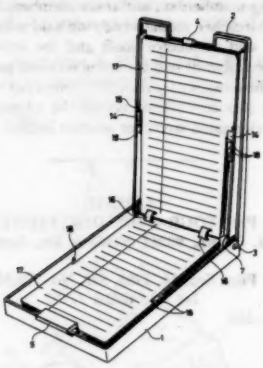
a container having an open face,

a cover pivotally mounted on a shaft passing through side walls of both the container and the cover,

the container cooperating with the cover to hold a plurality of cards stacked therebetween,

a resilient member producing a resilient force tending to

open the cover when it is unlocked and to expose a desired one of the cards, and



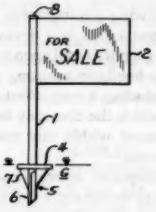
damping means including a viscous medium around said shaft for providing viscous resistance to the resilient force produced by the resilient member.

4,685,233

PORTABLE YARD SIGN

Jack W. Hull, 24476 Via Secreto, El Toro, Calif. 92630

Filed Mar. 25, 1985, Ser. No. 715,406
Int. Cl.[4] G09F *15/00*
U.S. Cl. 40—607 **11 Claims**



1. In a portable yard sign, a rigid upstanding channel-like post, a slot on one side of and extending downwardly from the top edge of said post, a sign panel, a foldable plastic member on a side edge of said panel corresponding in length to and insertable into said post slot, said member having formed therein hinge means and portions foldable toward said sign panel adapted for seating within said channel-like post for securing said sign panel in and extending outwardly from said post, said foldable portions being formed on opposed faces of said sign panel.

4,685,234

SURVEILLANCE MARKER CLIP ASSEMBLY

Philip M. Anderson, Madison, and Ronald K. Reich, Florham Park, both of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

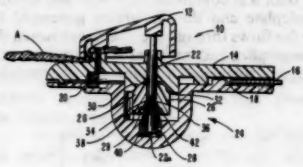
Filed Sep. 3, 1985, Ser. No. 772,214
Int. Cl.[4] G09F *14/04*
U.S. Cl. 40—625 **14 Claims**

1. A surveillance marker clip assembly or the like used in marking articles, comprising:

a housing;

securing means for attaching the clip assembly to the article;

positive lock means in said housing for receiving said securing means, said lock means being displaceable between an open position allowing release of the securing means and a closed position for locking;



mating edge means on said securing means and lock means for retaining the securing means with edge-to-edge engagement that resists withdrawal; and

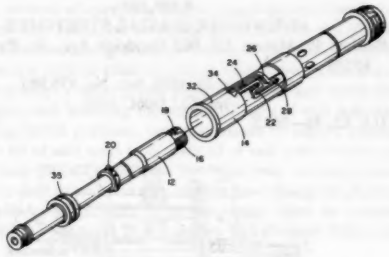
means for biasing said lock means to the closed position.

4,685,235

BARREL ALIGNMENT DEVICE IN AUTOMATIC WEAPON

Ernst Bunning, Durham, N.H., and Wayne Hutchins, Sanford, Me., assignors to Maremont Corporation, Carol Stream, Ill.

Continuation of Ser. No. 593,593, Mar. 26, 1984, abandoned. This application Sep. 8, 1986, Ser. No. 904,859
Int. Cl.[4] F41C *21/22*
U.S. Cl. 42—75.02 **8 Claims**



1. In an automatic weapon, the weapon having a barrel, barrel extension and a barrel support, the barrel and barrel extension having cooperating interrupted lugs and interposed spaces,

the improvement of an alignment device comprising a boss on the barrel and means on the barrel support for forming a plurality of alignment slots in the barrel support adapted to receive the boss, the alignment slots including an entry slot, a crossover slot and a retention slot, the crossover slot merging with the entry slot and the retention slot merging with the crossover slot,

the retention slot being aligned substantially along the length of the barrel support and having forward and rear ends, the crossover slot being substantially perpendicular to the retention slot and intersecting the retention slot intermediate the forward and rear ends of the retention slot such that the boss may reciprocate in the retention slot past the crossover slot,

the entry slot and boss being aligned in relation to the interrupted lugs such that upon movement of the barrel into assembled positin with the barrel extension, the boss enters the entry slot with the interrupted lugs on the barrel aligned with the interposed spaces on the barrel extension and vice versa,

the crossover slot and boss being aligned in relation to the interrupted lugs such that movement of the boss in the crossover slot causes facile cooperation of the interrupted lugs, and the retention slot and boss being aligned in rela-

tion to the interrupted lugs such that the boss may reciprocate in the retention slot while the interrupted lugs cooperate to attach the barrel to the barrel extension.

4,685,236

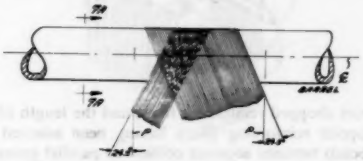
GRAPHITE/METAL MATRIX GUN BARREL

Sam May, R.R. 3, Box 172 A, Flagstaff, Ariz. 86001

Filed May 30, 1984, Ser. No. 615,234

Int. Cl.[4] F41C *21/02*; F41F *17/08*

U.S. Cl. 42—76.02 **12 Claims**



1. A gun barrel comprising an inner tubular liner forming the bore of the barrel and an outer annular jacket of carbon-fiber reinforced metal matrix material which includes at least two radial superimposed regions of wound fibers, the fibers in a first, inner region having higher ultimate tensile strength than the fibers in a second outer region and the fibers in outermost region having a higher modulus of elasticity than the fibers in the innermost region.

4,685,237

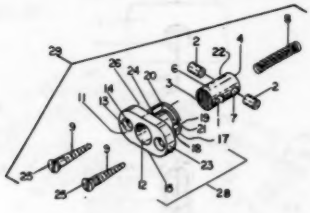
RETRACTABLE SWIVEL STUD

Clifford R. Hugg, 1621 S. Avenue H, Portales, N. Mex. 88130

Filed Aug. 19, 1986, Ser. No. 897,853

Int. Cl.[4] F41C *23/02*; F16B *7/20*

U.S. Cl. 42—85 **12 Claims**



1. A retractable stud assembly for affixing a detachable-type swivel to a structure, and including means for restraining said stud assembly in a flush mounted position within said structure, said stud assembly comprising:

a cylinder having a flanged portion and a central passageway extending therethrough adapted to movably retain a stud;

a stud movably received in said passageway and including an outer end and an inner end, said outer end of said stud extending beyond said flanged portion when in an extended position, and flush with said flanged portion when retracted to said flush mounted position;

means carried on said stud adjacent said outer end for detachably affixing a detachable-type swivel to said stud when said stud is in its extended position;

means on said cylinder for locking said stud in said flush mounted position; and

a spring means contacting said stud and resiliently biasing said outward end of said stud outwardly from said bore beyond said flange, and resiliently opposing inward retraction of said stud in said passageway toward said flush mounted position.

4,685,238

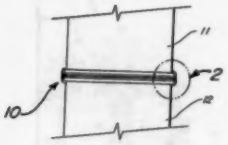
CLIP JOINING DEVICE

Stephen L. Schoepflin, Burney, Calif., assignor to John Frank Genova, Burney, Calif., a part interest

Filed Sep. 8, 1986, Ser. No. 904,416

Int. Cl.[4] F41C *27/00*

U.S. Cl. 42—90 **9 Claims**



1. A clip joining device for use in attaching a base plate of a first clip to a base plate of a second clip to increase the amount of ammunition readily available during use of a firearm, comprising:

a body having:

a first formed section positioned, oriented and shaped to fit around a first end of said base plate of said first clip;

a second formed section positioned, oriented and shaped to fit around a second end of said base plate of said first clip;

a third formed section positioned, oriented and shaped to fit around a first end of said base plate of said second clip, and

a fourth formed section positioned, oriented and shaped to fit around a second end of said base plate of said second clip.

4,685,239

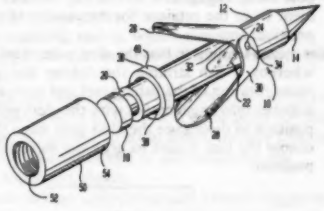
SPEAR POINT FOR FISHING SPEAR GUNS

Joseph B. LaMonica, Orange, Calif., assignor to Ann Runnells, Orange, Calif.

Filed Sep. 30, 1986, Ser. No. 913,321

Int. Cl.[4] A01K *81/04*

U.S. Cl. 43—6 **11 Claims**



1. A spear point for fishing spear guns which comprises:

a. a spear point shaft formed of a metal having a Rockwell hardness of at least 30, and distally bearing a pointed end;

b. an annular groove about the opposite end of said shaft from said pointed end; and

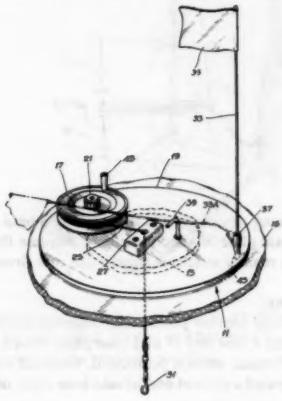
c. a spear point retainer sleeve formed of a softer steel than said shaft, and receiving in one end, said opposite end of said shaft, with an internally upset wall in said one end, opposite said annular groove and projecting therein, whereby said spear point is permanently secured to said spear point retainer sleeve.

4,685,240

ICE FISHING TIP-UP

Ilo Fralick, Box 394, Martin, S. Dak. 57551

Filed Jul. 10, 1985, Ser. No. 753,601
Int. Cl.[4] A01K *97/12*
U.S. Cl. 43—17 **4 Claims**



1. For use in ice fishing wherein a fishing line is disposed through an opening in a sheet of ice overlying a body of water through which opening a hooked fish is withdrawn, an improved ice fishing tip-up comprising:

base plate means including guide means and having a planar undersurface for covering the opening and for engaging the surface of the ice surrounding and defining the opening, the guide means defining a guide hole extending through the base plate means and having a diameter approximating the diameter of the fishing line for guiding the fishing line through the opening:

a fishing reel rotatably mounted on the base plate means;

a trip member on the fishing reel, movable through a tripper path upon rotation of the fishing reel;

a stationary non-rotatable hook shaped retainer affixed to the base plate means in spaced apart relation to the fishing reel;

an alert pole carried by the base plate means opposite the fishing reel and engageable by the retainer for retention in a horizontal waiting position in the tripper path, the alert pole being engageable by the trip member for disengagement from the retainer for movement to a vertical alert position; and

bias means tending to bias the alert pole to said afert position whereby a fish striking the fishing line is operative to cause rotation of the fishing reel and movement of the trip member into engagement with the alert pole in its waiting position to disengage the alert pole from the retainer and enable the bias means to urge the alert pole into its alert position.

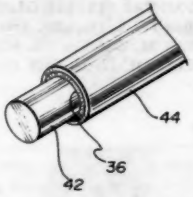
4,685,241

GRAPHITE FIBER FISHING ROD

Danny R. Foote, and Wayne O. Turner, both of Spirit Lake, Iowa, assignors to Berkley and Company, Inc., Spirit Lake, Iowa

Filed Jan. 7, 1985, Ser. No. 689,564
Int. Cl.[4] A01K *87/00*
U.S. Cl. 43—18.5 **3 Claims**

1. A fishing rod having a hollow tapered body of generally circular exterior cross-section, the rod having a hollow interior extending along the rod axis, said rod body being constructed of laminations of a plurality of plies of fiber reinforced resin in each of which is a sheet of collimated parallel generally axially aligned reinforcing fibers treated with a mixture of resin and short chopped reinforcing fibers which are uniformly dispersed throughout the resin and randomly oriented, the viscosity of the resin having been selected for supporting the dispersed short chopped reinforcing fibers and the length of the short chopped reinforcing fibers having been selected for forming bonds between adjacent collimated parallel generally axially aligned fibers.

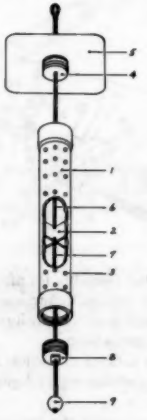


4,685,242

DEVICE FOR CUTTING OR CHOPPING LARGE PIECES OF BAIT INTO SMALLER ONES WHILE IMMERSED IN WATER

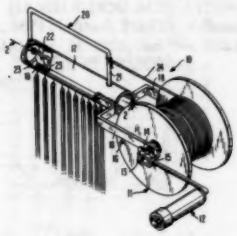
Ronald J. Stanish, 537 N. Rainbow Dr., Hollywood, Fla. 33021

Filed Sep. 2, 1986, Ser. No. 902,762
Int. Cl.[4] A01K *97/02*
U.S. Cl. 43—44.99 **6 Claims**



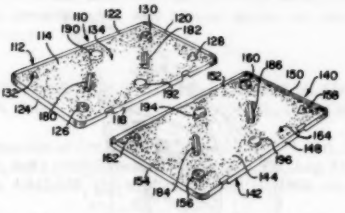
1. A waterpowered apparatus for chopping and dispensing bait while in water at variable depths of water comprising: a perforated container; removable end caps to said container; means for cutting affixed to cables slidably housed inside said container; one said cable having a free end passing through one said end cap, designated top end cap for connection to a line to a boat or other floating object, a second or bottom end cable having a free end passing through one said end cap designated bottom end cap for connection to a weight; said cables being of sufficient length and positioned with said cutting means inside said container such that said cutting means may act freely inside said container and upon said end caps; a stabilizer rigidly affixed to one said end cap.

4,685,243
TROTLINE REEL AND HOOK HOLDER
Calvin H. Pugh, P.O. Box 387, Blanco, N. Mex. 87412
Filed Nov. 28, 1986, Ser. No. 935,965
Int. Cl.[4] A01K *97/00*
U.S. Cl. 43—57.3 5 Claims



1. A trotline reel and hook holder, comprising, a yoke, said yoke attached to a sleeve at one end and means attached to the other yoke end for holding a fishing reel, a combination handle and rod received by said sleeve and means on the sleeve for retaining the shanks of a plurality of fish hooks received on said rod in said sleeve.

4,685,244
ENTRAPMENT APPARATUS
Arthur E. Marks, 2736 Lincoln La., Wilmette, Ill. 60091
Filed Jun. 25, 1986, Ser. No. 878,120
Int. Cl.[4] A01M *1/14*
U.S. Cl. 43—58 21 Claims



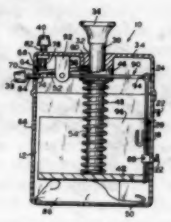
1. A trap for vermin adapted to be placed in facing relationship with another like trap in a package for storage, transport and sale, the trap comprising:

A. a tray having a bottom wall and four main side walls upstanding from the periphery of the bottom wall to define an opening into the tray;

B. a layer of vermin-trapping pressure sensitive adhesive material in said tray on said bottom wall, said layer having a top surface spaced below the top of said side walls; and

C. at least one rib extending from said bottom wall to a level above said layer and substantially equal to the top of said side walls, said rib having a length greater than its width and being arranged angled to said side walls to engage against and cross a like rib of a similar trap having its open side confronting the open side of the trap here defined to prevent substantial compression of said bottom walls of said confronting traps.

4,685,245
RODENT TRAP
Theodore M. LaPier, 78377 Swanson La., Cottage Grove, Oreg. 97424
Filed Feb. 27, 1987, Ser. No. 19,933
Int. Cl.[4] A01M *23/30*
U.S. Cl. 43—78 16 Claims



1. A rodent trap, comprising:

a. an enclosure, having at least one rodent entrance, a first aperature and a second aperature, formed therein;

b. a rodent-trapping member;

c. a shaft, attached perpendicularly to said rodent trapping member and extending therefrom through said first aperature formed in said enclosure;

d. said rodent-trapping member and attached shaft having two positions within said enclosure: a cocked position and a released position, wherein said rodent-trapping member and attached shaft are biased to travel from said cocked position to said released position unless retained in said cocked position;

e. cocked position retaining means, which comprise:

(1) an indentation formed in said shaft;

(2) a retaining pin, having an outer end and an inner end, extending from its said inner end within said indentation in said shaft when in said cocked position to its said outer end in the proximity of the said second aperature formed in said enclosure; and

(3) retaining pin supporting means, which means provide transverse support while allowing longitudinal movement of said retaining pin;

f. retaining pin releasing means, which means comprise:

(1) a retaining pin release bar, attached transversely to said retaining pin;

(2) a retaining pin release bar pivot means, which pivot means is located so as to provide a pivot point for said retaining pin release bar to pivot about, thereby causing movement of said outer end of said retaining pin;

(3) a release triggering means;

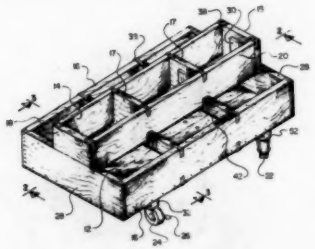
(4) mechanical linkage connecting said release triggering means to said retaining pin release bar, said mechanical linkage translating movement of said triggering means to said retaining pin release bar, which, in turn, through pivoting about said retaining pin release bar pivot means, biases said retaining pin into alignment with said second aperature of said enclosure so as to permit said outer end of the said retaining pin to exit through said second aperature of said enclosure; said exiting of said outer end through said second aperature withdraws said inner end of said retaining pin from within said indentation of said shaft, thereby releasing said shaft and rodent-trapping member onto said rodent.

4,685,246

COMPARTMENTALIZED PORTABLE GARDEN WITH RAISED CENTER

Lillie Fennell, 3751 S. Sutro Ave., Los Angeles, Calif. 90018

Filed Dec. 20, 1985, Ser. No. 794,656
Int. Cl.[4] A01G *9/02*
U.S. Cl. 47—66 **10 Claims**



1. A portable box garden assembly for simultaneously growing a plurality of different types of plants comprising:

a main elongated substantially rectangular box having two sides, two ends, and a bottom, for containing earth;

means for providing an upper gardening level comprising an elongated rectangular frame, open at the bottom, and supported centrally from said main elongated box, said means including two upper end members vertically aligned with the ends of said main box, but each having a length which is shorter than the ends of said main box, and said means for providing an upper gardening level also including two longitudinally extending sides secured to said upper end members to form said frame which provides an upper gardening level within its confines and residual lower gardening levels on either side thereof;

lower partition means mounted substantially flush with the upper edges of said main box for subdividing the lower gardening levels on both sides of said upper gardening frame;

upper partition means mounted flush with said frame for subdividing said upper gardening level; and

all of said gardening areas opening into a main lower space within said main box for containing earth;

whereby different groups of plants may be planted and segregated in each of the upper and lower gardening areas, but may be watered and drained as a single garden unit.

4,685,247

SAFETY BARRIER

Aftab Alam, 43 Colwyn Road, Leeds LS11 6LQ, West Yorks., England

Filed May 12, 1986, Ser. No. 862,283
Claims priority, application United Kingdom, May 14, 1985, 8512231; Jul. 2, 1985, 8516716
Int. Cl.[4] E06B *9/04*
U.S. Cl. 49—55 **9 Claims**

1. A child safety barrier intended for positioning between two upright support surfaces so as to extend therebetween, the barrier comprising:

a frame assembly of substantially rectangular structure having upper and lower elongate frame elements each intended to extend between the two support surfaces;

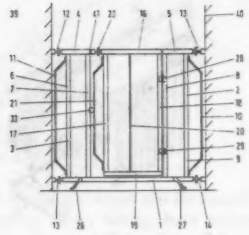
independently adjustable clamping means provided at each corner of said frame assembly for securing the barrier in position; and

a gate mounted in the frame assembly for movement between an open position allowing access through the barrier and a closed position in which the gate forms an integral part of the barrier;

in which:

the frame assembly comprises two co-planar rectangular frame members separated in their common plane but interconnected by said lower frame element;

the gate is hingedly mounted on one of said rectangular frame members and is capable of being clamped to the other of said rectangular frame members when the gate is in its closed position; and



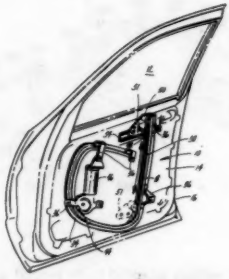
further clamping means provided on said gate for clamping engagement with the upper end of said other rectangular frame member, said further clamping means being operable to urge apart the upper ends of said rectangular frame members so as to counteract the tendency of the frame assembly the bend inwardly due to the action of the clamping means at the corners of the frame assembly and so as to increase the overall stability of the barrier.

4,685,248

WINDOW REGULATOR MECHANISM WITH RACK SUPPORTING TRACK OF RECTANGULAR CHANNEL SHAPE

Albert J. Hammond, Bloomfield, Mich., assignor to Ferro Manufacturing Corporation, Madison Heights, Mich.

Filed Jul. 14, 1986, Ser. No. 885,510
Int. Cl.[4] E05F *11/48*
U.S. Cl. 49—352 **6 Claims**



1. In a vehicle body door having a window opening and a window storage cavity beneath the window opening, a window movable between a raised position closing the opening and a lowered position stored in the storage cavity, and a window regulator mechanism connected to the window for moving the window along a path of movement between the raised and lowered positions, said regulator mechanism including an elongated hollow track having an inside surface of generally rectangular shape having four walls and a continuous slot in one of said walls, an elongated rack slidably supported on said inside surface and confined in said inside surface, said rack having teeth located within said inside surface at a position opposite said slot to enable driving of said rack longitudinally of said track to effect said movement of said window between said raised and lowered positions, said rack being

generally rectangular in shape corresponding substantially to the rectangular shape of said inside surface so that movement of said rack relative to said track is limited to movement lengthwise of said track.

4,685,249

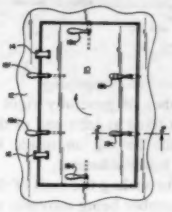
INDUSTRIAL AIR FILTER DOOR WITH STANDARD HANDLE-DOG ACTUATION

John W. Jacox, 5874 Northern Pine Pl., Columbus, Ohio 43229

Filed Apr. 21, 1986, Ser. No. 854,167

Int. Cl.[4] E05C *9/00*

U.S. Cl. 49—395 **11 Claims**



1. A door and closure assembly comprising:

(a) a door frame;

(b) a door having an outside surface and an inside surface which door is hingedly attached to said frame at an edge thereof; and

(c) a plurality of closure means for securing said door to said frame, said closure means comprising a handle located at the outside surface of the door; a dog located on the inside surface of the door; a rotatable shaft penetrating through said door and connecting said handle and said dog; door frame retention means cooperative with said dog for securing said door to said frame; and stop means disposed and cooperating with said retention means so that said handle and dog rotate in one direction only to secure said door and only in the opposite direction to unsecure said door, all of said handles being disposed in substantially the same position when said closure means are secure or unsecure.

4,685,250

SHARPENER FOR INDUSTRIAL KNIFE BLADES

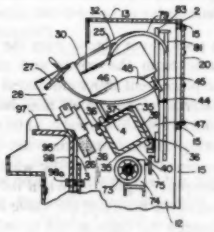
Leward N. Smith, Rte. 4, Box 160, Deckle Rd., Lake City, Fla. 32055

Continuation of Ser. No. 79,353, Sep. 27, 1979, Pat. No. 4,313,283, and a continuation of Ser. No. 297,930, Aug. 31, 1981, Pat. No. 4,442,635. This application Apr. 10, 1984, Ser. No. 598,708

The portion of the term of this patent subsequent to Feb. 2, 1999, has been disclaimed.

Int. Cl.[4] B24B *3/55, 7/02*

U.S. Cl. 51—56 R **10 Claims**



1. A sharpener for industrial knife blades and the like, comprising:

a main frame having means for releasably retaining a knife blade in a fixed relationship therewith;

an elongate beam supported on said main frame; said beam having a substantially rectangular transverse cross-sectional shape that is generally uniform along the length of said beam, and defines first and second adjacent faces with a first corner edge therebetween, and third and fourth adjacent faces with a second corner edge therebetween;

grinding means for sharpening a cutting edge of the knife blade;

carriage means for movably mounting said grinding means on said beam for translation thereon along a plane disposed substantially parallel with the cutting edge of the knife blade; said carriage mounting means comprising:

a generally L-shaped support operably connected with said grinding means, and including first and second legs;

a first roller mounted on said first support leg, and oriented to ride on a first way surface on said first beam face adjacent to the first corner edge of said beam;

a second roller mounted on said first support leg, and oriented to ride on a second way surface on said second beam face adjacent to the first corner edge of said beam;

a third roller mounted on said second support leg, and oriented to ride on a third way surface on said third beam face adjacent to the second corner edge of said beam;

a fourth roller mounted on said second support leg, and oriented to ride on a fourth way surface on said fourth beam face adjacent to the second corner edge of said beam, whereby said rollers capture said carriage on said beam; and

means for resiliently urging said rollers against the way surfaces on said beam for accurate grinding of the knife blade.

4,685,251

APPARATUS FOR INDEXING TURRETS FOR TOOLS IN GRINDING MACHINES AND THE LIKE

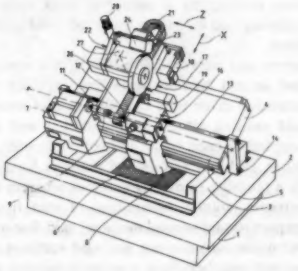
Rudolf Beyer, Esslingen; Lutz-Peter Heerdt, Altbach, and Roland Schemel, Schorndorf, all of Fed. Rep. of Germany, assignors to Schaudt Maschinenbau GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 27, 1986, Ser. No. 879,266

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3523012

Int. Cl.[4] B24B *41/04;* B23B *29/32*

U.S. Cl. 51—166 T **8 Claims**



1. Apparatus for changing the position of at least one part, particularly a grinding tool, with reference to a predetermined axis, comprising a first support, a second support rotatable with reference to said first support about said axis and arranged to carry said at least one part, said second support being movable axially relative to said first support and said supports having neighboring first and second surfaces which are normally in frictional engagement with one another to hold said second support against rotation about said axis and are separable from each other in response to axial movement of said

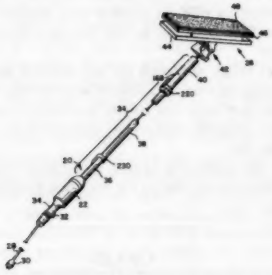
second support relative to said first support to permit angular movement of said second support relative to said first support; two coaxial bearing assemblies each having a first portion provided on said first support and a second portion provided on said second support, the first and second portions of each of said bearing assemblies being separated from each other when said surfaces are in frictional engagement with one another; and means for moving said second support axially to disengage said surfaces from each other and to engage the second portions of said bearing assemblies with the respective first portions.

4,685,252

RECIPROCATING SANDER

Felix C. Ponce, 225 S. Manhattan Pl., #104, Los Angeles, Calif. 90004

Filed Jul. 22, 1985, Ser. No. 757,452
Int. Cl.[4] B24B *23/04*
U.S. Cl. 51—170 TL **11 Claims**



1. A sanding tool comprising:

a lightweight sanding attachment;

a lightweight extension drive tube coupled to said sanding attachment; and

a motor coupled to said extension drive tube, said motor characterized by comprising a substantial portion of the weight of said tool and for providing motive force to said sanding attachment through said extension drive tube,

wherein said sanding attachment is a reciprocating sander,

further comprising a universal joint, said universal joint coupling said extension drive tube and said sanding attachment,

wherein said universal joint is further comprised of a first and second member, said first member coupled to said extension drive tube and said second member coupled to said sanding attachment, said first and second member coupled to each other and rotatable with respect to each other, said first and second member further characterized by a plurality of mating surfaces wherein a predetermined extreme angular orientation of said first member with respect to said second member, said first and second member come into contact and said surfaces of said first and second member form a smooth bearing surface with respect to each other, and wherein said predetermined extreme angular orientations of said first member relative to second member said angular orientation is permitted without interfering with the smooth relative rotation of said first member relative to said second member

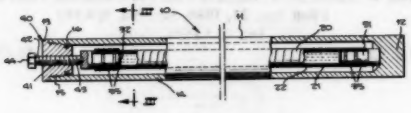
whereby a sanding tool is provided for use at positions spaced from said motor by at least a distance equal to the length of said extension drive tube and wherein a substantial portion of the weight of said sanding tool is concentrated in said motor assembly.

4,685,253

STRUCTURAL MEMBER

Jack G. Bitterly, 4723 Vista De Oro Ave., Woodland Hills, Calif. 91364

Continuation of Ser. No. 241,453, Mar. 6, 1981, abandoned. This application Nov. 13, 1984, Ser. No. 671,049
Int. Cl.[4] E04C *3/00*
U.S. Cl. 52—2 **42 Claims**



1. A structural member comprising:

(a) an outer member of generally rigid material having a closure member fixed at each end of the outer member;

(b) a pressure tube having an inside length very much greater than its inside diameter;

(c) end members for sealing the ends of the pressure tube, at least one end member being movable with respect to the pressure tube;

(d) mounting means between the outer member and the pressure tube for mounting the pressure tube within the outer member, the end members contacting the closure members for force transmission, and the pressure tube being out of force transmission contact with the outer member;

(e) pressurizing means for pressurizing the inside of the pressure tube to urge the end members against the closure member and to radially load the pressure tube; and

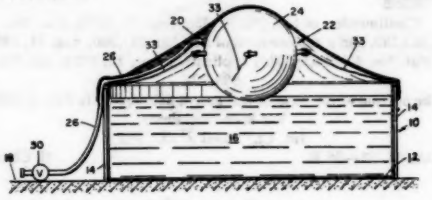
(f) free acting means between the end members and the pressure tube permitting at least one end member to move freely in the pressure tube for limiting the axial load on the pressure tube from the end members.

4,685,254

SWIMMING POOL COVER SUPPORT, COVERED SWIMMING POOL AND METHOD OF COVERING A SWIMMING POOL

Claude J. Terreri, 324 Tanner Marsh Rd., Guilford, Conn. 06437

Filed Jan. 29, 1986, Ser. No. 823,723
Int. Cl.[4] E04H *3/16*
U.S. Cl. 52—2 **9 Claims**

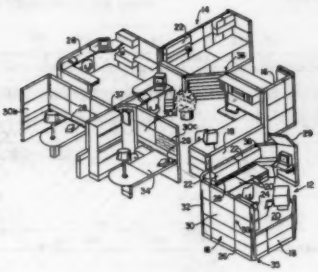


1. A support for a pool cover placed over the support, said support being separate from the cover and comprising an inflatable balloon for placement in its uninflated condition on the surface of the water in a pool, an air hose having one end attached directly to the balloon and a valve at its other end, the balloon having securing means permitting the balloon to be secured in a predetermined position on the water surface and the hose being of sufficient length that when the balloon is so secured, the other end of the hose and the valve can be located outside the pool, whereby the balloon can be inflated to raise the cover by forcing air into the hose and the balloon through the valve and later deflated to lower the cover by allowing air to escape from the balloon through the hose and the valve.

4,685,255
WORK SPACE MANAGEMENT SYSTEM

James O. Kelley, Spring Lake, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed Sep. 10, 1984, Ser. No. 648,900
Int. Cl.[4] A47B 5/02; E04F 19/06; H02G 3/00, 3/06
U.S. Cl. 52—36 35 Claims



1. A work space management system for dividing a room into separate work areas comprising:

a rigid framework formed of rigid rectangular frames rigidly joined together at the edges thereof to form at least one work area;

baseline wire management means for enclosing communication and/or power wiring secured to a base of at least some of said frames, said baseline wire management means including a baseline cover forming an outer face of said baseline wire management means and an electrical receptacle accessible by means of said baseline cover to provide an electrical outlet for said work space;

waistline wire management means for enclosing communication and/or power wiring, said waistline wire management means including a cover forming an outer face of said waistline wire management means and an electrical receptacle accessible by means of said waistline cover to provide an electrical outlet for said work space;

means for removably mounting said waistline wire management means to at least some of said frames at a working height well above the base thereof, said removable mounting means permitting relative ease of mounting and demounting said waistline wire management means, respectively, to and from said frames at the point of installation;

electrical and/or communication wiring extending between at lease some of said baseline wire management means and said waistline wire management means;

a plurality of lower panels sized to fit between said waistline wire management means cover and said baseline wire management means cover to substantially cover said frames therebetween; and

means for removably securing said lower panels to said frames between said waistline and said baseline wire management means covers and in substantially coplanar relationship therewith.

4,685,256
CONNECTION BETWEEN THE LOWER EDGE OF A SKYLIGHT AND THE ADJACENT ROOF COVERING

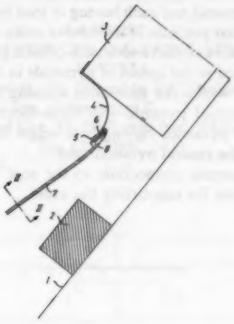
Peter Alkjaer, Glostrup, Denmark, assignor to V. Kann Rasmussen Industri A/S, Soborg, Denmark

Filed Mar. 12, 1986, Ser. No. 838,827
Claims priority, application Denmark, Mar. 26, 1985, 1360/85
Int. Cl.[4] E04D 1/36
U.S. Cl. 52—58 1 Claim

1. A connection between an edge of a skylight window and an adjacent roof covering, the window including a frame having a bottom portion and lateral edges comprising:

a covering rail secured to the bottom portion of the frame, said covering rail having a lower edge portion;

a skirt comprising a finely corrugated sheet of lead and having a upper edge, wherein the corrugations extend substantially parallel to the lateral edges of the frame, and said lower edge portion of said covering rail defines a



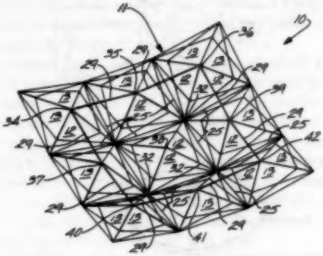
folded joint with the upper edge of the skirt, said lower edge portion being immovable relative to said upper edge of the skirt; and

a strip of plastic material positioned at the upper edge of said skirt, said strip completely filling said corrugations of said skirt and defining an adhesive bond between said skirt and said lower edge portion of said covering rail.

4,685,257
SHELTER ROOF STRUCTURE

Donald L. Richter, Rolling Hills Estates, Calif., assignor to Temcor, Torrance, Calif.

Filed May 10, 1985, Ser. No. 732,590
Int. Cl.[4] E04B 1/34
U.S. Cl. 52—73 32 Claims



1. A roof structure of the canopy type comprising:

(a) a plurality of at least twelve saddle-like three-dimensional four-cornered structural units, each having a first axis extending along a basal diagonal between non adjacent basal corners and lying along a valley dividing the unit into two substantially triangular portions, each unit having peripheral connection edges extending between adjacent corners which include nonadjacent apical corners at the ends of an apical diagonal and spaced from the valley at the tips of the triangular portions, the corners of each unit being disposed out of a common plane, the apical and basal diagonals having substantially different curvature with the apical diagonal being curved more than the basal diagonal sufficiently that when a central pyramid is formed by four of such units, the uncommon apical corners of the four units not connected to define the central pyramid are not coplanar with the basal corners of such units;

(b) the saddle-like units being connectable to each other along their connection edges in a predetermined relation to define at least a canopy principal module composed of twelve of the units forming (1) a central four-sided pyramid having faces defined by the triangular portions of four of the units and a quadrilateral base and (2) portions of eight additional similar pyramids contiguous to the central pyramid and each having at least two faces defined by triangular portions of the twelve units, and in which all apical corners of the twelve units of each principal module are disposed at the apices of pyramids in the module, and further in which the four units forming the faces of the module central pyramid also form faces of four of the additional pyramids having base edges common to base edges of the central pyramid; and

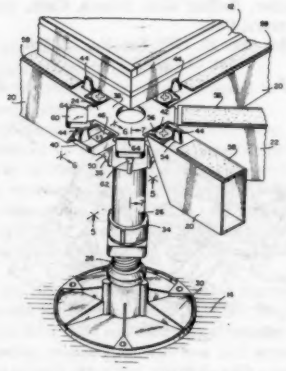
(c) support means connectible to the roof structure at selected points for supporting the same.

4,685,258

ACCESS FLOORING SYSTEM WITH INCREASED LOAD CAPACITY

Joseph Av-Zuk, Holon, Israel, assignor to Alcol, Ltd., Holon, Israel

Filed Dec. 3, 1985, Ser. No. 804,295
Claims priority, application Israel, Dec. 5, 1984, 73748
Int. Cl.[4] E04D *15/00*
U.S. Cl. 52—126.6 **11 Claims**



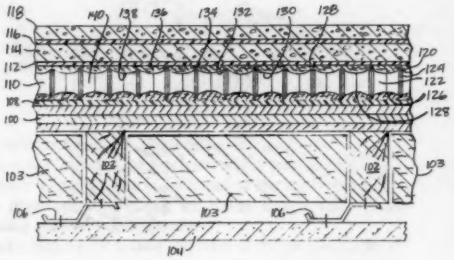
1. In an access flooring system comprising a skeletal grid of horizontal floor panel edge supporting stringers arranged in a plurality of horizontal rectangles and a plurality of pedestal means for supporting the panel edge supporting stringers adjacent the ends of each of the edge supporting stringers at the corners of each rectangle and for supporting the corners of floor panels, the improvement comprising at least one additional horizontal stringer extending diagonally across a selected rectangle formed of four edge supporting stringers and at least two pedestal means including means for supporting the additional stringer adjacent the ends of the additional stringer, the two pedestal means being positioned at diagonal corners of the selected rectangle, the additional stringer including means for medially supporting a floor panel positioned over the selected rectangle, whereby the access flooring system maintains an increased load bearing capacity.

4,685,259

SOUND RATED FLOOR SYSTEM AND METHOD OF CONSTRUCTING SAME

Laurence L. Eberhart, and Larry B. Holben, both of Dublin, Ohio, assignors to Peabody Noise Control, Inc., Dublin, Ohio

Filed Feb. 14, 1986, Ser. No. 829,835
Int. Cl.[4] E04B *1/82*; E04F *13/08*
U.S. Cl. 52—144 **29 Claims**



1. An acoustic isolating medium adapted to be positioned intermediate a subflooring and a finished flooring to provide a sound-rated flooring, said isolating medium comprising:

(a) a sound attenuation layer comprising

(i) a core having wall means forming cells open to at least one side of the core; and

(ii) at least one acoustically semi-transparent first facing of fibrous material and a binder formed to provide a relatively hard outer surface, the first facing being bonded to said first side of the core; and

(b) a rigid layer positioned above the sound attenuation layer and comprising means for supporting the finished flooring in a substantially rigid fashion,

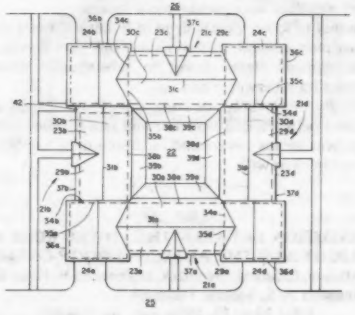
whereby a sound-rated flooring is provided in which the finished flooring is substantially acoustically isolated from the subflooring.

4,685,260

PRECONSTRUCTED MULTIPLE-UNIT HOUSING

Louis J. Jenn, Indianapolis, Ind., assignor to Atrium Structures, Inc., Indianapolis, Ind.

Continuation of Ser. No. 823,125, Jan. 27, 1986, abandoned, which is a continuation of Ser. No. 513,734, Jul. 14, 1983, abandoned. This application Aug. 12, 1986, Ser. No. 896,305
Int. Cl.[4] E04H *1/00*
U.S. Cl. 52—169.3 **6 Claims**



1. A dwelling structure comprising:

four elongate rectangular living units, each having two long sides and two ends, said elongate living units arranged in quadrangular relationship with respect to each other to enclose an open-air court and further arranged such that one long side of each living unit faces said open-air court

and is aligned with the ends of the adjacent living units; and

four rectangular storage units, each associated with a respective living unit and arranged such that one side of the storage unit abuts one end of the associated living unit and an adjacent side of the storage unit abuts one end of an adjacent living unit, the sides of the storage units having length dimensions greater than the width dimensions of the abutted living units.

4,685,261

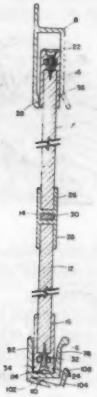
STORM SHUTTER

Freddie Seaquist, P.O. Box 4597, Corpus Christi, Tex. 78469

Filed Apr. 1, 1985, Ser. No. 718,551

Int. Cl.[4] E06B *9/00*

U.S. Cl. 52—202 **6 Claims**



1. A shutter apparatus for protection of a window mountable on a window frame comprising:

an upper bracket having a top side, a first side, and a second side, said first side and said second side being connected to said top side, said first and second sides being spaced sufficiently apart to accept a protective shutter and being sufficiently long and sufficiently close together to securely retain said protective shutter between them and being sufficiently strong to hold said protective shutter against perpendicular forces exerted against said protective shutter, said first side having first and second faces, said first face being flared away from said second side to facilitate placement of said protective shutter within said upper bracket, said upper bracket having guide means to facilitate mounting said upper bracket on an upper portion of said window frame, said upper bracket being mountable on said window frame with said upper bracket opening downward;

a lower bracket having a bottom side, a first side and a second side, said first side and said second side being connected to said bottom side, said first and said second sides being spaced sufficiently apart to accept a protective shutter and being sufficiently long and sufficiently close together to securely retain said protective shutter between them and being sufficiently strong to hold said protective shutter against perpendicular forces exerted against said protective shutter, said first side having first and second faces, said first face being flared away from said second side to facilitate placement of said protective shutter within said lower bracket, said lower bracket having a guide means to facilitate mounting of said lower bracket on a lower portion of said window frame, said lower bracket mountable on said window frame with said lower bracket opening upwardly, said lower bracket having an inner face and an outer face and and adjustable support member attached at an acute angle to said outer face of said bottom side for adjusting the orientation of said lower bracket relative to said upper bracket;

a shutter comprised of a rigid material and a frame, said shutter being sized to fit securely within both said upper and lower brackets and being sufficiently strong and shatter resistant to protect said windows.

4,685,262

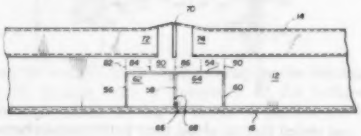
MAIN BEAM FOR CEILING PANEL SUSPENSION SYSTEM

Thomas C. Meredith, Jr., Columbia, S.C., assignor to Consolidated Systems, Inc., Columbia, S.C.

Filed Oct. 17, 1985, Ser. No. 788,629

Int. Cl.[4] E04C *2/00*

U.S. Cl. 52—232 **18 Claims**



1. In the main beam of a fire rated ceiling panel suspension grid system including a web having a lower marginal edge with a ceiling panel supporting flange extending laterally outward therefrom on both sides; an upper marginal edge with a spaced wall, rigidity enhancing bead; longitudinal ends configured for attachment to each other; and a compressible section intermediate said ends for accommodating longitudinal thermal expansion without lateral deformation sufficient to defeat the support of ceiling panels by said flanges; the improvement wherein said compressible section comprises:

a pair of immediately adjacent tabs formed from said web integral only with the lower marginal edge thereof with confronting vertical edges laterally deformed out of the plane of said web in opposite directions to facilitate passage of said tabs by each other without substantial departure from the plane of the web when said flange buckles downwardly out of the plane thereof as a result of thermal expansion of the beam; and

an interrupted bead with confronting vertical edges deformed laterally out of the plane of the web in opposite directions to facilitate the passage of the portions of said bead immediately adjacent said interruption on opposite longitudinal sides by each other as a result of the thermal expansion of the beam without substantial departure from the plane of the web, the sides of said bead being laterally compressed adjacent said interruption with the confronting vertical edges thereof vertically aligned with the confronting vertical edges of said tabs,

the uninterrupted area of said web vertically intermediate said bead and said tabs forming a web strap laterally deformable under longitudinal thermal expansion of the beam without (a) causing the laterally uncompressed portion of said bead to depart from the plane thereof or (b) being severed so that the structural integrity of the beam is maintained,

whereby the beam is longitudinally compressible by thermal expansion without twisting sufficiently to defeat the support of ceiling panels by said flanges.

4,685,263

ALUMINUM PLATE CURTAIN WALL STRUCTURE

Raymond M. L. Ting, 318 Holiday Dr., Pittsburgh, Pa. 15237

Filed May 23, 1986, Ser. No. 866,271

Int. Cl.[4] E04H *1/00*

U.S. Cl. 52—235 **12 Claims**

1. A metal plate exterior wall structure comprising a number

of individual panels securely fastened to a wall supporting frame system, both vertical and horizontal sealed reveal joints being formed between said panels, each individual panel including a front plate and a top perimeter member, two side perimeter members, and one bottom perimeter member, the perimeter members being structurally connected to the front

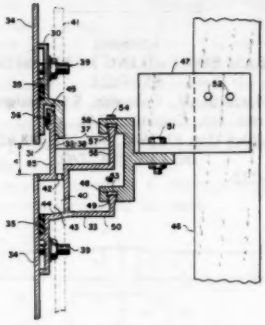


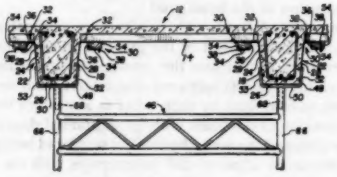
plate and sealed thereto along their perimeters in between, the improvements comprising an internal horizontal gutter in said top perimeter member said top perimeter member having an enclosed hollow space with exterior end openings below said internal horizontal gutter, at least one hole at the bottom of the said internal horizontal gutter for leading condensate into the said enclosed hollow space.

4,685,264

CONCRETE SLAB-BEAM FORM SYSTEM FOR COMPOSITE METAL DECK CONCRETE CONSTRUCTION

Donald H. Landis, Pittsburgh, Pa., assignor to Epic Metals Corporation, Rankin, Pa.

Filed Apr. 9, 1986, Ser. No. 849,795
Int. Cl.[4] E04B *1/00*
U.S. Cl. 52—252 **17 Claims**



1. In a slab-beam formwork system for receiving poured concrete in the constructing of a roof or floor, comprising:

a generally U-shape channel form adapted to form a concrete beam for said system and having an outwardly extending support means extending generally in a horizontal plane and being part of at least one sidewall of said channel form adjacent an opening for said receiving of said poured concrete,

said support means consisting of at least two generally horizontal support areas, one said area being on an upper elevational level in close proximity to said opening of said channel form and the other of said area being on a lower elevational level remote from said opening of said channel form,

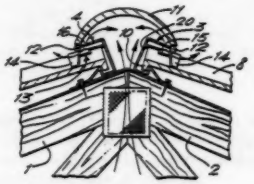
each of said areas adapted to support a structural member for the forming of said slab, and said areas having means adapted to alternately support said structional member in the pouring of said concrete whereby said structural member is positionable on said one area on said upper elevational level to become a composite part of said slab, or said structural member is positionable on said other area on said lower elevational level to be removed after the forming of said slab.

4,685,265

ROOF RIDGE CAPPING SYSTEM

Christopher A. Cooper, Maidstone, England, assignor to Marley Tile A.G., Switzerland

PCT No. PCT/GB83/00158, § 371 Date Feb. 14, 1984, § 102(e) Date Feb. 14, 1984, PCT Pub. No. WO84/00187, PCT Pub. Date Jan. 19, 1984
PCT Filed Jun. 21, 1983, Ser. No. 589,103
Claims priority, application United Kingdom, Jun. 25, 1982, 8218521
Int. Cl.[4] E04D *1/30;* E04B *7/06;* F24F *7/02*
U.S. Cl. 52—277 **9 Claims**



1. A roof ridge capping system comprising:

at least one capping member positioned over a roof ridge to provide a cap therealong;

a reentrant portion connected to the capping member on at least one side thereof and extending inwardly thereunder, said reentrant portion overlying upper ends of roof tiles located adjacent the ridge, said tiles having profiled upper surfaces;

a filler member interposed between the upper surfaces of the tiles and the reentrant portion, the filler member comprising a flat portion defining an upper surface region which engages the reentrant portion, said flat portion being provided at one end thereof with a downwardly extending depression which lies within a longitudinal channel of the tile profile;

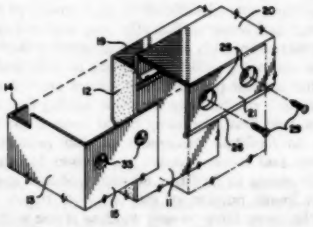
wherein said upper surface region of said filler member is provided with at least one recess located adjacent said depression which defines with the reentrant portion a ventilating flow passage, means being provided for placing said flow passage in flow communication with an interior of the roof ridge beneath the capping member.

4,685,266

OVERHEAD DOOR PANEL AND METHOD OF MAKING

Willis Mullet, 3341 Edgewater Dr., Gulf Breeze, Fla. 32561

Filed Nov. 18, 1985, Ser. No. 798,966
Int. Cl.[4] E04C *1/00;* E06B *3/12*
U.S. Cl. 52—309.11 **10 Claims**



1. An overhead garage door panel comprising: a front sheet

metal skin and a rear skin of insulating material; a core of synthetic resin foam enclosed between the front and rear skins and cured in place onto said front skin, said front skin having rearwardly disposed upwardly offset longitudinally extending channels for forming shiplap joints with like door panels, said channels being double-thick folded-over sheet metal and terminating in an upper and lower edge supporting said rear skin; and a bead formed in said edges and coextensive with said channels, said rear skin being attached by laying an adhesive along said bead and applying said rear skin thereto.

4,685,267

BOX VOID

Gary L. Workman, Lombard, Ill., assignor to Deslauriers, Inc., Bellwood, Ill.

Filed Aug. 1, 1983, Ser. No. 519,087
Int. Cl.[4] E02D *31/14*; E04B *5/32*
U.S. Cl. 52—577 **1 Claim**

1. In combination with a concrete formation having a void area, a reinforced box-like structure incorporated in said void area, said box-like structure comprising an assembled blank having a top, a bottom, a pair of end flaps each having a T-slot, a pair of side flanges, and transverse score lines positioned thereon, a pair of side flaps each having a plurality of slots on their outer edges, and a face, said end flaps being folded into uniformly shaped partitions by folding said side flanges 90° along a first score line and 90° along a second score line, said partitions being divided into a pair of upper partitions and a pair of lower partitions with said T-slot located therebetween, said upper partitions being folded inwardly toward each other to create four structurally uniform partitions aligned along said face of said reinforced insert, each pair of upper partitions being interconnected to said lower partitions by a common double thickness wall, said face forming the bottom of said partitions while said side flaps are folded to form the top of said partitions, said side flaps being folded inwardly to intersect said partitions, said slots of said side flaps matingly engaging said T-slots of said end flaps in an interlocking manner when said side flaps are folded inwardly toward said partitions to form a closure around said partitions so that the completed structure can be assembled at a construction site.

4,685,268

METHOD AND APPARATUS FOR REINFORCING BUILDING BRICK VENEER FOOTINGS

Roger E. Roy, 11601 W. River Rd., Champlin, Minn. 55316

Continuation-in-part of Ser. No. 727,750, Apr. 26, 1985, abandoned. This application Jun. 4, 1986, Ser. No. 870,367
Int. Cl.[4] E02D *19/00*
U.S. Cl. 52—742 **5 Claims**

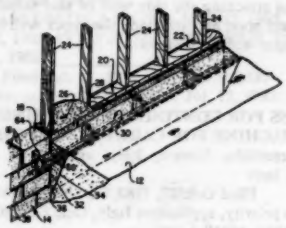
1. A method of reinforcing a concrete footing for brick veneer to be applied to the outside vertical wall of a structure, comprising the steps, performed prior to the pouring of the concrete footing, of:

(a) providing a support bracket including:

(i) a hook portion having a shoulder and a leg generally perpendicular to the shoulder; and

(ii) a support portion formed integrally with the hook portion and having a first length forming an acute angle with the leg of the hook portion and a second, wall engaging length extending from the first length of the support portion and disposed generally perpendicular to the leg of the hook portion, a distal end of the wall engaging length being spaced from the leg of the hook portion;

(b) mounting a support bracket so provided to a foundation of which a foundation wall is constructed by inserting the leg of the hook portion of the support bracket through a hollow space formed within a foundation block and sliding the bracket downwardly to engage the shoulder of the hook portion with a periphery of the hollow space through which the leg of the hook portion has been inserted; and



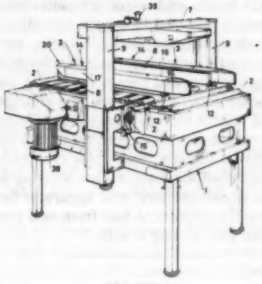
(c) sliding the distal end of the wall engaging length of the support portion of the bracket beneath an underside of the foundation block to which the bracket is being mounted.

4,685,269

ACCIDENT PREVENTION DEVICE FOR MOTORIZED-BELT PULLING UNITS FOR CARDBOARD BOX TAPING MACHINES

Augusto Marchetti, Piazza Sicilia, 7, 20146 Milano, Italy

Filed Jan. 15, 1986, Ser. No. 819,106
Claims priority, application Italy, Jan. 24, 1985, 20590/85[U]
Int. Cl.[4] B65B *7/16*
U.S. Cl. 53—167 **3 Claims**



3. An accident protection device for a motorized belt pulling unit for a cardboard box taping machine, the unit having an inlet end and an outlet end defined by horizontally spaced-apart vertical pulleys and an endless belt carried by said pulleys, said protection device comprising: a metal hood extending longitudinally of said belt and having a flat upper wall and a flat vertical side wall, said side wall being spaced from and parallel to one run of the belt, said upper wall and side wall terminating at the outlet end of the unit in straight edges which lie in a vertical plane located approximately at the periphery of the respective pulley facing the other pulley; and a one-piece terminal member constructed of plastic material having a flat upper wall substantially coplanar with the upper wall of said hood and overlying said respective pulley, a flat side wall substantially coplanar with the side wall of said hood and a curved front wall covering an upper portion of the belt, said

front wall merging with the upper wall and side wall of said terminal member, said front wall and said side wall of said member developing downward from said upper wall of said member with progressively decreasing height substantially starting from the front center line of the belt in such a manner as to describe a descending oblique lower edge capable of conveying out of the operating area of the belt any bodies or objects pulled by the uncovered part of the belt, and connecting means attaching the side wall of said member to the side wall of said hood and attaching the upper wall of said member to the upper wall of said hood.

4,685,270

PROCESS FOR CONTINUOUS WRAPPING AN OBJECT AND MACHINE FOR CARRYING OUT THE PROCESS

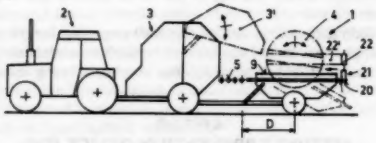
Dario Brambilla, Novara, Italy, assignor to Dario Manuli S.p.A., Italy

Filed Oct. 27, 1983, Ser. No. 545,852

Claims priority, application Italy, Oct. 27, 1982, 23963 A/82; Mar. 4, 1983, 19918 A/83

Int. Cl.⁴ B65B *11/04*

U.S. Cl. 53—176 **10 Claims**



1. An apparatus for wrapping a compressed hay bale with an extensible self-adhesive film comprising a cradle, said cradle comprising means to support a cylindrical compressed hay bale, said cradle further comprising a multiplicity of at least three rollers distributed in a circular arc around a compressed cylindrical hay bale supported in said cradle, said rollers being located closely adjacent one another and comprising means to rotate a cylindrical hay bale about its axis while supported in said cradle, means for winding a strip of film about a bale while supported in said cradle, said winding means comprising a reel and means to move said reel in a path extending around said cradle and a bale supported in said cradle, carriage means supporting said cradle including a pair of wheels for transporting said carriage means, and means for tilting said cradle on said carriage means about a horizontal axis arranged parallel to the axes of said rollers for unloading a bale from said cradle motor traction means, a press connected to said motor traction means to be drawn thereby, said press comprising means to press hay into a cylindrical bale, means hooking said cradle to said press to be drawn thereby, said apparatus further including means to expel a cylindrical bale from said press and transport the expelled bale to said cradle.

4,685,271

MEDICATION PACKAGING AND DISPENSING SYSTEM

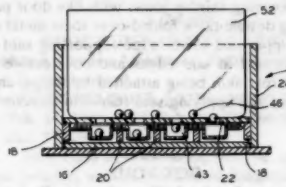
Donald A. Ringer, Goodland, Ind., and Michael R. Greco, Oak Brook, Ill., assignors to Drug Package, Inc., O'Fallon, Mo.

Filed Jan. 30, 1986, Ser. No. 824,060

Int. Cl.⁴ B65B *5/06, 39/06*

U.S. Cl. 53—246 **12 Claims**

1. A system for packaging and dispensing pills or like objects into a plurality of cavities in a container, said system comprising a box-like housing with a first opening at the top and a second opening in a lower portion of the housing, a lower template adapted to be removably inserted into the housing through the second opening to position said container in the housing, a second template superimposed over the lower template, means for holding apart said lower and second templates with a space between them while in said housing to receive said container in said space, said second template having a number of holes of a size to receive a predetermined number of pills, said holes being positioned over the cavities in said container, and a means for spreading the pills along the second



template to fill the holes as the pills are swept along the second template.

4,685,272

SHEET SEPARATING DEVICE IN A PACKAGING MACHINE

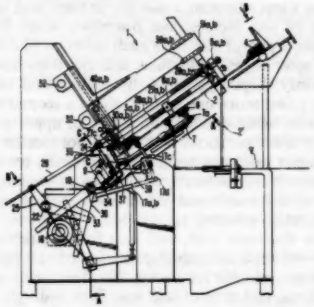
Koji Kawai; Hisashi Murata, and Koichi Okamoto, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 26, 1986, Ser. No. 900,627

Claims priority, application Japan, Sep. 27, 1985, 60-147909[U]

Int. Cl.⁴ B65H *5/08*

U.S. Cl. 53—389 **1 Claim**



1. A sheet separating device in a packing machine which machine includes a magazine disposed in an inclined attitude for accommodating flat sheets, a sheet separating device for separating only one sheet positioned at the lowermost level in said magazine from the other sheets, which device consists of seam hooks that can be rocked in the direction for supporting said sheets and in the direction for releasing the same, side hooks that can be operated inversely to said seam hooks for supporting said sheets, said seam and side hooks are operated by cam means in a mutually correlated manner, and suction arms each having vacuum cups and sucking and rocking the sheet at the lowermost level, a vacuum cup arm provided with vacuum adhesion means and driven by a crank mechanism so as to pull down said only one sheet separated by said sheet separating device and thereafter to be held still for a predetermined period of time, and fixed guides adapted to be engaged with said sheet that is being pulled down for folding said sheet into a U-shape; characterized in that in order to constitute means for reliably separating sheets positioned at the lowermost level in the magazine one by one, there are provided two stages of main and auxiliary side hooks which can be rocked in the direction for supporting said sheets and in the direction for releasing the same as operated inversely to said seam hooks, on the both left and right sides of said magazine so that said side hooks can be rocked in correlation with said suction arms, each

of the respective side hooks has its supporting position for the sheets made movable, and the side hooks are adjustably disposed so that the interval between the side hooks on the left and right sides of said magazine can be varied with said main and auxiliary side hooks on each side held integrally.

4,685,273

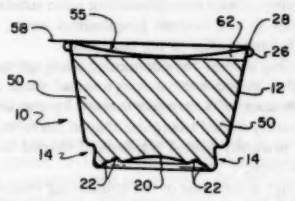
METHOD OF FORMING A LONG SHELF-LIFE FOOD PACKAGE

Ali R. Caner, Woodstock, and Kenneth B. Spencer, Barrington, both of Ill., assignors to American Can Company, Greenwich, Conn.

Division of Ser. No. 582,159, Feb. 27, 1984, Pat. No. 4,542,029, which is a continuation of Ser. No. 275,395, Jun. 19, 1981, abandoned. This application Apr. 30, 1985, Ser. No. 728,974

Int. Cl.[4] B65B *3/00, 63/08*

U.S. Cl. 53—440 **8 Claims**



1. A method of forming a long shelf life package of a food product in a multilayer plastic container that is not susceptible of sidewall deformation or product deterioration notwithstanding hot-filling of a foodstuff therein with potential development of high vacuum and is hermetically sealed by a high gas barrier easily peel-openable flexible closure, the food product having been hot-filled at from about 180° F. to about 190° F., the container being adapted to prevent the development of high internal vacuum therein upon cooling of the product, hold a reduced internal vacuum and prevent paneling of the container side wall, comprising the steps of:

selecting and providing an open-top plastic container body of multilayer construction which includes a high gas barrier layer, the body having a side wall extending from its top where it has an annular sealing surface to its bottom where it joins with an integral bottom wall, the side wall having sufficient rigidity to resist paneling in response to internal vacuum in the container, and the bottom wall having sufficient flexibility to flex inwardly in response to an internal vacuum to relieve vacuum forces and thereby prevent the side wall from paneling,

selecting and providing a flexible high gas barrier colsure disc to close the open top of the container, which disc is capable of flexing from a substantially planar configuration to an inwardly bowed configuration in response to internal vacuum,

filling the container with a hot foodstuff which is at a temperature of from about 180° F. to about 190° F. and which foodstuff has a substantial vapor pressure, to a level which leaves an unfilled headspace volume in the container,

promptly hermetically sealing the open top of the container by bonding the closure disc to the annular sealing surface in a substantially flat plane across the surface,

said disc flexing from said plane to a more inward position in response to an internal vacuum, said inward flexing of both the bottom wall and closure disc being cooperative to prevent development of high internal vacuum upon cooling of the food product, and cooperative with the paneling resistant side wall, thereby to prevent inward paneling of the side wall,

said sealing of the closure disc being effected by selecting an adhesive to provide a seal which is hermetic, will withstand the potentially high internal vacuum developed in the container and the flexing of the closure disc, withstand the reduced partial internal vacuum which exists subsequent to the flexings, and yet provide easy peel-opening of the closure disc from the container.

4,685,274

PACKAGING FOODSTUFFS

Anthony J. M. Garwood, Victoria, Australia, assignor to Garwood Ltd., Victoria, Australia

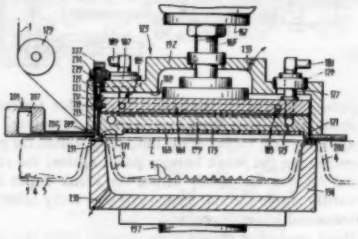
PCT No. PCT/AU84/00131, § 371 Date Mar. 12, 1985, § 102(e) Date Mar. 12, 1985, PCT Pub. No. WO85/00339, PCT Pub. Date Jan. 31, 1985

PCT Filed Jul. 12, 1984, Ser. No. 717,235

Claims priority, application Australia, Jul. 12, 1983, PG0246

Int. Cl.[4] B65B *31/04, 31/06, 47/10*

U.S. Cl. 53—433 **17 Claims**



1. An improved packaging method for producing an air evacuated and desired gas filled package, said method comprising:

(a) providing a cup shaped depression in a web of package material to provide a packaging base,

(b) providing a product in said depression,

(c) providing a cover for said base,

(d) providing a gas flushing member between the cover and the base, said gas flushing member being plate like and having an opening therethrough,

(e) passing said cover through said opening so that it extends from one face of the gas flushing member, through said opening, to the opposite face of the gas flushing member and over said depression, said gas flushing member having gas passageway means therein which terminates with said opening in the region where said cover passes through said opening from said one face,

(f) closing an air evacuation chamber over the components and the gas flushing member so that it makes a substantially air tight seal with said one face and said opposite face,

(g) evacuating air from said air evacuation chamber so that air within said depression will be evacuated,

(h) expelling desired gas from said gas passageway means so that it discharges between said cover and said base and can enter said depression,

(i) sealing the cover to said base around the edge surfaces of said depression, whereby to provide said air evacuated and desired gas filled package.

4,685,275

CARTON OPENING APPARATUS

Biagio J. Nigrelli, Sr., 14829 Moraine Rd., Kiel, Wis. 53042

Filed Jun. 11, 1986, Ser. No. 872,912

Int. Cl.[4] B65B *43/34*

U.S. Cl. 53—458 **14 Claims**

1. Apparatus for opening folded open side cartons, the cartons being folded into blanks having leading and trailing edges and an upper layer having leading and top panels and a lower layer in facing contact with the upper panels and having trail-

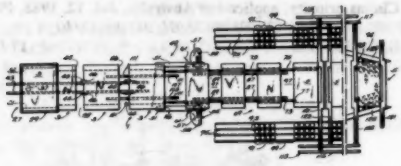
ing and bottom panels, each panel having a pair of oppositely extending flaps comprising:

a. horizontal rail means for supporting the lower layer panels of the folded blanks during longitudinal motion thereof downstream along an unfolding path;

b. storage means for storing a supply of folded blanks;

c. first conveyor means for propelling the blanks downstream along the horizontal rail means from the storage means at a first speed;

d. second conveyor means for accelerating the blanks to propel them downstream to an unfolding station at a second speed greater than the first conveyor means speed;



e. plow means at the unfolding station for restraining the blank lower layer flaps in an angular downward attitude;

f. expansion arm means at the unfolding station for positively restraining the blank bottom panel against the rail means and for simultaneously lifting the blank upper layer upwardly above the rail means and upwardly relative to the restrained lower layer; and

g. third conveyor means downstream from the unfolding station operated in timed relation to the second conveyor means and to the expansion arm means for cooperating with the expansion arm means to unfold the blank at the unfolding station and for propelling open cartons downstream from the unfolding station.

4,685,276

METHOD FOR PRODUCING AND FILLING BOTTOM-FOLD BAGS AND APPARATUS FOR EXECUTION OF THE METHOD

Hans R. Kiel, Verden/Aller, Fed. Rep. of Germany, assignor to Effem GmbH, Verden/Aller, Fed. Rep. of Germany

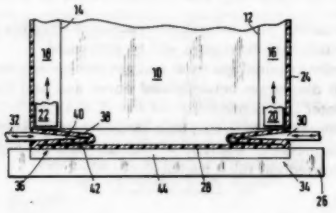
PCT No. PCT/DE85/00059, § 371 Date Dec. 18, 1985, § 102(e) Date Dec. 18, 1985, PCT Pub. No. WO85/03919, PCT Pub. Date Sep. 12, 1985

PCT Filed Feb. 27, 1985, Ser. No. 793,052

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1984, 3407045; Jul. 4, 1984, 3424654

Int. Cl.[4] B65B *43/10*

U.S. Cl. 53—459 **24 Claims**



1. A method for producing bottom-fold bags from endless tubular material comprising:

inwardly folding the tubular material along a first pair of oppositely spaced fold lines at a juncture of the tubular material and the ends of a flat bottom of the bag being formed to form two lateral, substantially triangularly shaped, inwardly-facing bottom flaps, in the vicinity of which the tubular material is in three layers;

simultaneously, inwardly folding the tubular material along a second pair of oppositely spaced fold lines at a juncture of the tubular material and the sides of a flat bottom of the bag being formed, perpendicular to the first pair of fold lines, to form two substantially trapezoidal shaped, inwardly-facing longitudinal bottom flaps;

pressing the tubular material forming the two substantially triangular shaped inwardly-facing bottom flaps together and connecting at least two of the three layers;

pressing the two trapezoidal shaped longitudinal bottom flaps together and connecting them such that they form a bottom longitudinal seam therebetween, parallel to the second pair of fold lines and perpendicular to the first pair of fold lines, and such that they partially overlap and abut the two triangularly shaped lateral bottom flaps to thereby form a rectangularly shaped flat bottom surface to the tubular material capable of supporting the bag thus formed from the tubular material in a standing position when filled:

providing at least one connecting seam substantially at right angles to the bottom longitudinal seam, arranged near each lateral edge of the bag; and

providing at least one connecting seam substantially at right angles to the bottom longitudinal seam, arranged near each apex of a triangle formed by the abutment of the inwardly folded triangular shaped lateral bottom flaps and the inwardly folded trapezoidal shaped longitudinal bottom flaps;

such that at least one of the connecting seams is linear and is divided in its longitudinal extension.

4,685,277

METHOD AND APPARATUS FOR INTRODUCING COMPACT DISKS INTO COMPACT DISK BOXES

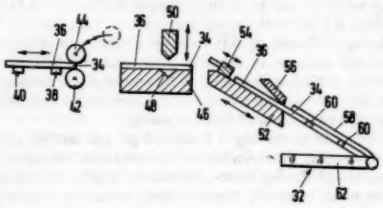
Heino Ilsemann, Am Wehkamp 3, 2800 Bremen, Fed. Rep. of Germany

Filed Oct. 6, 1986, Ser. No. 915,674

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1985, 3536509

Int. Cl.[4] B65B *61/20, 5/12*

U.S. Cl. 53—474 **24 Claims**



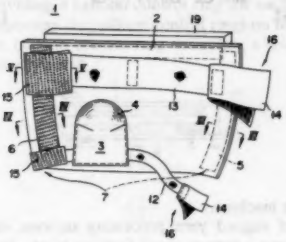
1. In a method for introducing a compact disk into compact disk box which has a lower part having a hinge connection along one edge to a lid having an inside surface with retaining noses for retaining a booklet against the inside surface, said method including inserting the booklet, inserting a sheet of printed matter into the lower part, inserting a tray for supporting the compact disk onto the sheet in the lower part, and then inserting the compact disk into the tray, the improvement comprising the step of inserting the booklet including the step of positioning the box with the lid being opened, positioning the booklet with its back edge facing the open lid, moving the booklet with a back edge engaging the inside surface of the lid adjacent a front edge of the lid opposite the hinge connection, applying pressure to slide the booklet into a retained position with the back edge moving towards the hinged connection and the edges of the booklet being retained by the retaining noses of the lid.

4,685,278

HORSE LEG GUARDS

Hideo Mitsuoka, 1-31, Nishiki-machi, Okayama-shi, Okayama-ken, Japan

Filed Aug. 28, 1985, Ser. No. 770,279
Claims priority, application Japan, Aug. 28, 1984, 59-129245
Int. Cl.[4] B68B 7/00
U.S. Cl. 54—82 7 Claims



1. A horse leg guard comprising:

a resilient cloth having first and second ends and upper and lower edge portions for wrapping the articulated portion of a horse leg;

an articulation abutting portion secured to said resilient cloth between said first and second ends having an outer skin for contacting and protecting said articulated portion when said resilient cloth is wrapped around the horse leg;

an engaging means for detachably attaching said first and second ends of said resilient cloth together for securing said horse leg guard to the horse leg and for maintaining the articulation abutting portion on said articulated portion when said resilient cloth is wrapped around the horse leg;

a sealing member detachably attached to said upper edge portion of said resilient cloth for sealing a gap formed between said resilient cloth and the horse leg when said resilient cloth is wrapped around the horse leg; and

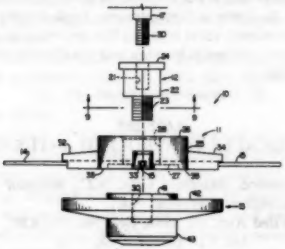
means secured to said upper edge for detachably attaching said sealing member to said resilient cloth.

4,685,279

WEED TRIMMER

Bradley T. Gullett, 560 Lake Kathryn Cir., Casselberry, Fla. 32707

Filed Jan. 17, 1986, Ser. No. 819,637
Int. Cl.[4] A01D 34/67, 50/00
U.S. Cl. 56—12.7 12 Claims



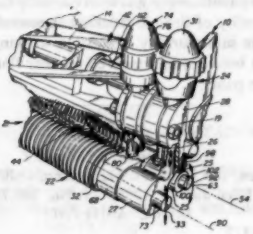
1. A weed trimmer having an arbor for attachment to an existing power tool, a head for supporting at least one flexible cutter, a circular shield engageable with said arbor through the head for connecting the head to the power tool and at least one flexible cutter mounted on the head and extending in a U-shaped configuration with the ends extending outwardly from the head and the central portion of the cutter spaced from the ends positioned to be clamped, means for physically clamping the said central portion of the cutter between the head and the shield to hold it in operative position during use, and said means including first means on the head for supporting the said central portion in position to be clamped and second means on the shield increasingly frictionally engageable with the said central portion of the cutter to clamp it between the head and the shield as the shield engages the arbor to connect the head to the power tool.

4,685,280

MOWER CUTTING UNIT

Lawrence L. Lloyd, Pacific Grove, Calif., and Barbara Lloyd, executor, 1001 Olmstead Ave., Pacific Grove, Calif. 93950

Continuation-in-part of Ser. No. 545,971, Oct. 26, 1983, Pat. No. 4,494,365. This application Dec. 18, 1984, Ser. No. 683,292
The portion of the term of this patent subsequent to May 22, 2001, has been disclaimed.
Int. Cl.[4] A01D 34/42
U.S. Cl. 56—256 30 Claims



1. A cutting head for use with a turf cutting unit having a frame, the cutting head comprising:

a generally horizontal slotted expunger roller for mounting to the frame for rotation about an expunger roller axis, an outer expunger roller surface and a plurality of vertically disposed annular slots located in a predetermined axial pattern along said expunger roller, said slots dividing said expunger roller surface into a plurality of expunger roller surface segments; and

a cutter, including a plurality of cutting edges aligned with said annular slots, rotatably drivenly mounted adjacent and behind said expunger roller with at least a portion of said cutting edges passing within said annular slots;

whereby horizontally disposed plant matter is raised up into said annular slots as said expunger roller surface segments roll over said plant matter to allow said cutter to cut said raised up plant matter.

4,685,281

HAY SPREADER

Walter Reber, Saverne, France, assignor to Kuhn, S.A., Cedex, France

Filed Jul. 18, 1985, Ser. No. 756,182
Claims priority, application France, Jul. 19, 1984, 84 11625
Int. Cl.[4] A01D 78/12
U.S. Cl. 56—370 24 Claims

1. An agricultural machine comprising:

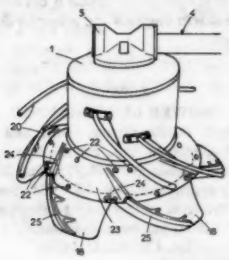
(a) at least one at least generally vertically oriented drum, said at least one at least generally vertically oriented drum comprising an at least generally cylindrical, tubular wall;

(b) means for rotating said at least one at least generally vertically oriented drum about a central at least generally vertical axis;

(c) a tapered annular flange situated at the lower end of the wall of said at least one at least generally vertically oriented drum;

(d) a plurality of flexible working segments attached to said tapered annular flange and extending downwardly and outwardly therefrom; and

(e) at least one panel attached to said tapered annular flange and to said plurality of flexible working segments, said at



least one panel covering at least partially the upper ends of said plurality of flexible working segments;

(F) wherein said plurality of flexible working segments are held fast between said tapered annular flange and said at least one panel.

4,685,282

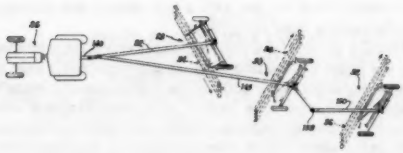
HAY RAKE ASSEMBLY

David R. Allen, 180 No. Fruit St., Fresno, Calif. 93706

Filed Jul. 29, 1985, Ser. No. 760,759

Int. Cl.[4] A01D *7/00*

U.S. Cl. 56—377 **14 Claims**



1. A ground-traversing, land working apparatus comprising:

(a) a set of working units;

(b) each of said working units comprising:

(i) a work implement having wheels for traversing the ground and defining a work implement travel direction;

(ii) a gooseneck connected to and extending from said work implement;

(iii) orienting means for substantially independently selectably establishing the angle of extension of said gooseneck relative to said work implement travel direction;

(c) said working units each having pivotal attachment means to permit the towing of same, whereby said orienting means can establish the angle of extension of each of said goosenecks relative to the respective work implement such that independent selective paths across the ground are traversable by the work implements of said set;

(d) a towing vehicle for said working units and a control means mounted on said towing vehicle and accessible to an operator thereon, said control means being operable to operate the orienting means of the responsive working units; and,

(e) said goosenecks and respective work implements being mutually rotatable about a vertical axis, and said orienting means each comprising a hydraulic cylinder operative between the respective gooseneck and work implement, and said control means comprises manually operable hydraulic valves.

4,685,283

LOCATING DEVICE FOR SERVICE TENDER

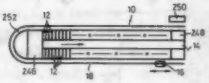
Walter Slavik, Horgen; Ernst Engeli, Au/ZH, and André Lattion, Seuzach, all of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed May 18, 1984, Ser. No. 611,746

Claims priority, application United Kingdom, May 24, 1983, 8314305

Int. Cl.[4] D01H *15/02*

U.S. Cl. 57—263 **12 Claims**



1. In a textile machine,

a plurality of aligned yarn processing stations, each said station having a yarn package forming means for receiving a yarn from a normal yarn path and a locating element;

a rail extending along said stations;

a service tender movably mounted on said rail to selectively engage said rail and having service elements for re-establishing a yarnline on said normal yarn path following an interruption in yarn processing;

reversible drive means for moving said tender into alignment with a selected station;

a locating device on said service tender for cooperating with said locating element of a selected station to align said tender to said selected station without interference with a relative movement between said tender and said stations; and

releasble securing means for engaging said rail to prevent relative movement of said selected station and said aligned tender after aligning of said tender with said selected station.

4,685,284

METHOD OF PRODUCING A TWISTED YARN

Peter R. Philipp, Charlotte, N.C., and Jean Weber, Brussels, Belgium, assignors to Maschinen Fabrik Schärer AG, Erlenbach, Switzerland

Filed Dec. 12, 1985, Ser. No. 809,063

Claims priority, application Switzerland, Dec. 20, 1984, 6079/84

Int. Cl.[4] D01H *13/30, 1/00;* **B65H** *54/08*

U.S. Cl. 57—295 **6 Claims**

1. A method of producing twisted yarn, comprising the steps of precision doubling several single yarns on a precision winding machine to form a homogenous high-density precision package of untwisted yarn; treating the precision package with a liquid medium; and withdrawing and simultaneously twisting the treated yarn.

4,685,285

PNEUMATICALLY CONTROLLED ANTI-BALLOON DEVICE

Robert C. Leonard, Bessemer City, N.C., assignor to Jenkins Metal Corporation, Gastonia, N.C.

Filed Aug. 18, 1986, Ser. No. 897,420

Int. Cl.[4] D01H *7/18, 1/42*

U.S. Cl. 57—356 **10 Claims**

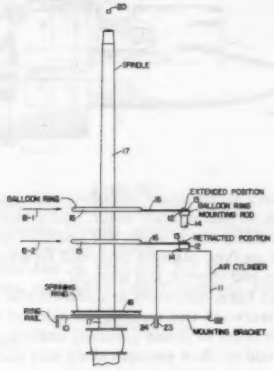
1. Apparatus for the control of yarn ballooning while a yarn package is being formed on a rotating spindle by a vertically traversing ring rail movable successively through the lower and upper portions of its traverse, said apparatus comprising a balloon control ring encircling the spindle, means locating the ballon control ring at a first position spaced above the ring rail, means maintaining the balloon control ring at said first position for movement with the ring rail during the lower portion of its

traverse, means locating the balloon control ring at a second position closer to the ring rail as the ring rail begins the upper portion of its traverse, and means maintaining the balloon control ring at said second position for movement with the ring rail during the upper portion of its traverse.

10. A method of controllin the ballooning of yarn while it is being formed into packages on rotating spindles by a traversing ring rail, said method comprising the steps of:

(a) providing a balloon control ring for each spindle,

(b) supporting the balloon control rings on the ring rail with each balloon control ring encircling a spindle supported on the ring rail,



(c) locating the balloon control rings at a first position above the ring rail during the lower portion of the traverse,

(d) maintaining the balloon control rings at said first position for movement with the ring rail during the lower portion of the traverse,

(e) sensing a preselected position of the ring rail near the beginning of the upper portion of its traverse,

(f) then locating the balloon control rings at a second position closer to the ring rail, and

(g) maintaining the balloon control rings at said second position for movement with the ring rail during the upper portion of the traverse.

4,685,286

METHOD OF DISASSEMBLY FOR A GAS TURBINE ENGINE

Frederick C. Hetzer, Northford, and Guy W. Miller, Vernon, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 606,060, May 2, 1984, Pat. No. 4,611,464. This application Nov. 26, 1985, Ser. No. 801,971

Int. Cl.[4] **F02G** *3/00;* **F02C** *1/06*

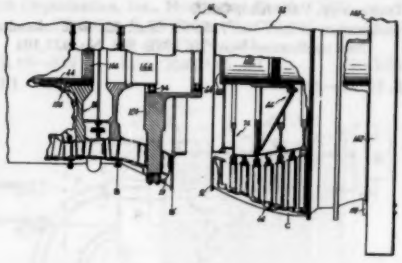
U.S. Cl. 60—39.02 **10 Claims**

1. In a method of disassembling an axial flow gas turbine engine having a rotor shaft, a rotor blade assembly, an outer case, a bearing supported from the outer case which is adapted to engage an annular second shaft and to support only said rotor shaft and said annular second shaft, and an annular second shaft which is joined to the rotor blade assembly, wherein the annular second shaft engages the bearing to support only the rotor blade assembly and said rotor shaft, and wherein the annular second shaft is capable of movement in the axial direction with respect to the rotor shaft, and is coupled to the rotor shaft in the axial and circumferential directions, an improvement comprising the steps of:

uncoupling the rotor shaft and the annular second shaft-rotor blade assembly;

separating the rotor shaft and the rotor blade assembly by relative movement between the shafts in the axial direction to provide access to the interior of the engine;

supporting the rotor blade assembly from the outer case



through the annular second shaft after separating the second shaft and the rotor shaft to avoid relative radial movement between the outer case and the rotor blade assembly during disassembly.

4,685,287

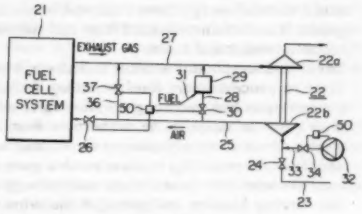
COMPRESSOR SYSTEM AND START-UP METHOD THEREFOR

Yoshiyuki Takuma, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 20, 1985, Ser. No. 800,028

Int. Cl.[4] **F02C** *7/26*

U.S. Cl. 60—39.07 **5 Claims**



1. A compressor system comprising:

a compressor;

a turbine connected to drive said compressor;

a compressed air source capable of supplying compressed air sufficient for starting the turbine;

a first conduit connected for supplying compressed air from said source to said turbine;

an auxiliary burner connected in said first conduit between said compressed air source and said turbine;

a bypass conduit connected in parallel with said auxiliary burner between said compressor and said turbine for bypassing said auxiliary burner, said bypass conduit having a connection means to said compressed air source; and

control means for controlling the flow of compressed air such that said turbine is first driven only by compressed air from said compressed air source supplied through said bypass circuit and connection means during start-up of said compressor, and such that, after said compressor has been started, said turbine is driven by compressed air from said compressor supplied through said bypass conduit, together with air compressed by said compressor supplied to said auxiliary burner, said auxiliary burner then being fired and said compressed air source thereafter being shut off to keep said turbine running only on the compressed air from said compressor.

4,685,288

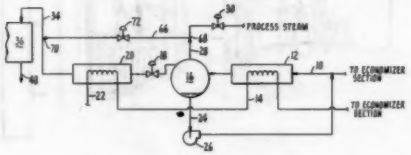
APPARATUS FOR REMOVING NONCONDENSABLE GASES FROM COGENERATED PROCESS STEAM IN DUAL FLUID CHENG CYCLE ENGINES

Dah Y. Cheng, Los Altos, Calif., assignor to International Power Technology, Palo Alto, Calif.

Continuation of Ser. No. 715,091, Mar. 22, 1985, abandoned. This application Nov. 20, 1986, Ser. No. 933,101

Int. Cl.[4] F02C *6/18*

U.S. Cl. 60—39.55 **1 Claim**



1. An apparatus for removing noncondensable gases from process steam cogenerated in a steam-injected gas turbine engine said engine comprising:

(a) a chamber;

(b) compressor means for introducing air into said chamber;

(c) means for introducing steam within said chamber, said steam introducing means including an automatically controlled steam injector valve and steam injection line,

(d) means for heating said air and steam in said chamber, including means for combustion;

(e) turbine means responsive to a mixture of air, combustion products and steam for converting the energy associated with the mixture to mechanical energy;

(f) counterflow heat exchanger means, including at least superheater and evaporator sections, for transferring residual thermal energy from a mixture of air, combustion products and steam exhausted from said turbine means to incoming water and steam,

wherein said evaporator section includes a water storage drum, a process steam line, a venting location in said process steam line, and a cogeneration valve which allows high pressure steam to be withdrawn from said water storage drum to supply process steam, and wherein the apparatus for removing noncondensable gases comprises:

a small diameter tube, joined at one end to the process steam line venting location and joined at the other end to the steam injection line which is part of said steam introducing means, whereby non-condensable gases are permitted to flow through the tube from the venting location to the steam injection line without interfering with the operation of the automatic steam injection control valve.

4,685,289

POWER PLANT FOR MODEL JET AIRCRAFT

Robert S. Violett, 1373 Citrus Rd., Winter Springs, Fla. 32708, and W. Lee Anderson, 1233 South Ross, Santa Ana, Calif. 92707

Continuation-in-part of Ser. No. 272,914, Jun. 12, 1981, Pat. No. 4,557,107. This application Nov. 14, 1985, Ser. No. 797,922

The portion of the term of this patent subsequent to Dec. 10, 2002, has been disclaimed.

Int. Cl.[4] A63H *27/06*

U.S. Cl. 60—269 **3 Claims**

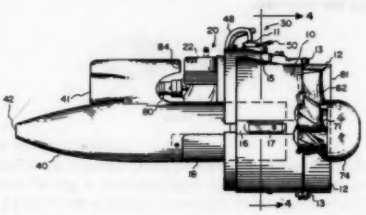
1. A model plane power plant employing an engine having a drive shaft and a portion of the engine extending generally transverse to said drive shaft, said power plant comprising:

(a) a generally cylindrical duct having a central axis and having a forward end adapted to face into a direction of travel and a rearward end opposite said forward end;

(b) a multibladed fan having an axis of rotation and being rotatably positioned in said duct adjacent said forward end, said axis of rotation of said fan being generally coincident with said axis of said duct;

(c) an engine mounted with said duct adjacent said rearward end, said engine having a drive shaft extending forwardly to said fan, said engine further including a portion thereof extending laterally across said duct and generally transverse to said drive shaft;

(d) a primary stator extending laterally across said duct between said laterally extending engine portion and said fan in order to direct air flow through said duct around said laterally extending portion of said engine;



(e) secondary stator means extending across said duct and spaced from said primary stator, said primary stator and said secondary stator means and said duct defining a plurality of air flow passages from said forward end to said rearward end thereof; and wherein

(f) said duct flares outwardly to a non-circular cross section at said rearward end on opposite sides of said primary stator, in order to obtain generally uniform cross section area of said air flow passages along said duct.

4,685,290

ENGINE CONTROL WITH FUNCTION TO ELIMINATE MINUTE PARTICLES IN EXHAUST GAS

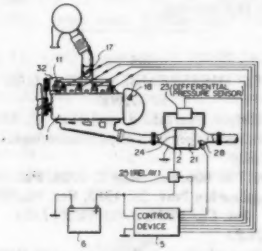
Sigeru Kamiya; Akikazu Kojima, both of Nukata, and Yasuyuki Sakakibara, Nishio, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Nov. 12, 1985, Ser. No. 797,023

Claims priority, application Japan, Nov. 19, 1984, 59-242440

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—274 **9 Claims**



1. A method of controlling an internal combustion engine having a function of eliminating minute particles in exhaust gas by using a fuel injection valve which is provided in the internal combustion engine and in which a fuel injection timing is controlled, a filter temperature sensor, inserted in an exhaust path, for measuring a temperature of a filter for trapping minute particles in exhaust gas, and an electric heater for removing minute particles deposited on the filter by combustion, said method comprising the steps of:

detecting a filter condition of particle deposition on said filter for which a restoration of a filtering function is required;

generating a preheating instruction for preheating the filter

by raising a filter temperature when said filter condition is detected;

generating a signal for changing, based on said filter preheating instruction, an injection pattern of the fuel injection valve for preheating the filter;

determining based on a signal from said filter temperature sensor, whether or not said preheating for raising the filter temperature is completed;

energizing said electric heater to combust particles on the filter, based on a condition of preheating of said filter; and

releasing the filter preheating mode after said energization of said electric heater.

4,685,291

DIESEL PARTICULATE TRAPS

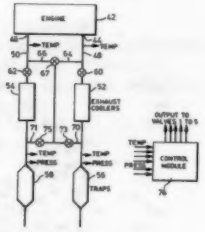
Kong Ha, Burlington, Canada, assignor to Ontario Research Foundation, Mississauga, Canada

Filed Jun. 30, 1986, Ser. No. 880,054

Claims priority, application United Kingdom, Jun. 28, 1985, 8516420

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—286 **4 Claims**



1. For use with a diesel engine having at least one exhaust bank, a particulate trap system comprising:

an exhaust conduit ducting exhaust materials firstly through an exhaust cooler, thence to a diesel particulate trap, thence to the atmosphere,

a by-pass conduit connected in parallel with the exhaust cooler between a first location upstream of the cooler and a second location downstream of the cooler but upstream of the trap,

a first valve in the exhaust conduit between said first location and the cooler,

a second valve in the by-pass conduit,

and microprocessor-based control means which carries out the steps of

(a) allowing normal operation with the first valve open and the second valve closed,

(b) when backpressure in the exhaust conduit reaches a predetermined level due to particulate build-up in the trap, gradually opening the second valve and closing the first valve, thereby allowing exhaust materials to by-pass the cooler,

(c) when the trap begins to regenerate thereby causing increased temperature in the trap, closing the second valve and opening the first valve.

4,685,292

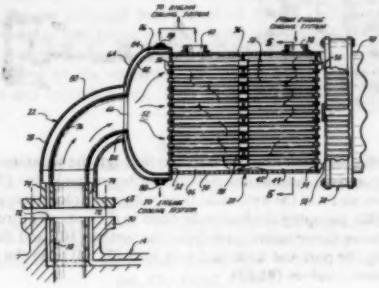
EXHAUST COOLING SYSTEM FOR INTERNAL COMBUSTION ENGINE

William D. Brigham, Huntington Beach, and Dinh Nguyen, Orange City, both of Calif., assignors to Zwick Energy Research Organization, Inc., Huntington Beach, Calif.

Filed Sep. 9, 1985, Ser. No. 774,045

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—320 **17 Claims**



1. A compact exhaust cooling system for an internal combustion engine comprising:

an exhaust manifold adapted to be mounted to the engine block of an internal combustion engine for receiving hot exhaust gases therefrom, said manifold having an integral manifold cooling jacket including coolant inlet means and a manifold outlet including one or more coolant discharge ports adjacent a gas discharge port;

a duct terminating in a gas distribution header, said duct and header being double walled so as to define a continuous cooling jacket fully enveloping both said duct and header, said duct having an inlet end, said inlet end including coolant inlets into said second cooling jacket and a gas inlet to said duct, means for connecting said inlet end to said manifold outlet with said coolant and gas inlets in respective alignment with said coolant and gas outlets such that coolant from said manifold jacket flows through said continuous cooling jacket and returns to the engine through one or more coolant return ports in said header while engine exhaust gas flows from said manifold gas outlet into said duct gas inlet;

a heat exchanger comprising a vessel having an upstream end, a downstream end and a plurality of gas tubes extending through said vessel between said ends, said tubes open at each said end exteriorly to said vessel, said header being connected to said upstream end for supplying engine exhaust gas to said gas tubes, and means for circulating coolant through the interior of said vessel in heat exchanging contact with said gas tubes for cooling the exhaust gas passing through said gas tubes;

whereby the hot exterior surfaces of all exhaust gas conduits from said engine block to said downstream end of said heat exchanger are fully and continuously jacketed with circulating coolant and thus effectively shielded against contact with flammable substances in the engine operating environment.

4,685,293

AIR BLEEDING SYSTEM FOR HYDRAULIC CLOSED CIRCUITS

James B. McBeth, N. Vancouver, Canada, assignor to Teleflex Incorporated, Limerick, Pa.

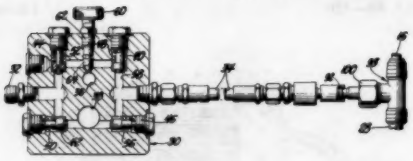
Filed Jun. 19, 1985, Ser. No. 746,526

Int. Cl.[4] F15B *21/04*

U.S. Cl. 60—327 **27 Claims**

27. A method of bleeding a closed hydraulic system (10) of

the type for steering a boat, said method comprising the steps of: connecting port and starboard tank lines (32,34) of a closed separator tank (30) to the port and starboard hydraulic lines (26,28), respectively, leading from the port and starboard sides of a hydraulic cylinder (18) to the port and starboard sides of a steering pump (12) through quick disconnect valves (91,93) to define a closed hydraulic circuit; pumping hydraulic fluid



from the port tank line (32) into and through the separator tank (30) in one direction and out the starboard tank line (34) to remove air from the hydraulic fluid within the closed separator tank (30); pumping the hydraulic fluid in the opposite direction to remove the remaining air from the system (10); and disconnecting the port and starboard tank lines (32,34) from the quick disconnect valves (91,93).

4,685,294

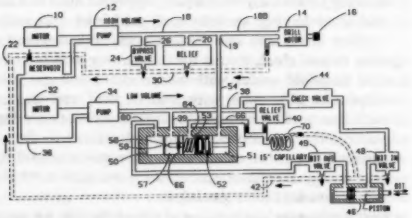
VISCOSITY-TEMPERATURE COMPENSATOR FOR HYDRAULIC SYSTEMS

Houston B. Mount, II, Tulsa, Okla., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 452,577, Dec. 23, 1982, abandoned. This application Apr. 18, 1985, Ser. No. 724,849

Int. Cl.[4] E21B *49/06*; F16D *31/00*

U.S. Cl. 60—329 **6 Claims**



1. A hydraulic control system for use in a sidewall coring tool to control a hydraulic motor used to drive a bit and a ram means for advancing and retracting the bit from the sidewall of a bore hole comprising

a high volume hydraulic system having first conduit means for connecting a hydraulic pump to a hydraulic motor used to drive a bit and second conduit means for connecting said hydraulic motor to a reservoir for the hydraulic fluid, wherein, there is a pressure drop when hydraulic fluids flow through said first and second conduit means,

a low volume hydraulic system connected to a hydraulic ram means for advancing or retracting said bit,

a control valve comprising a housing having a first and second chambers separated by a partition, a piston in said first chamber movable between a first position and a second position, with the second position being closer to said partition, and with said piston being in sealing relationship with the interior surface of said first chamber for the purpose of separating said first chamber into two compartments, a means urging said piston away from said partition, an orifice in said second chamber, a means connected to said piston and extending through said partition in sealing relationship with said partition for adjusting the flow of fluid through said orifice, a bleed port for the communication of fluids between the exterior of said housing and a location in said first chamber between said second position of said piston and said partition, an inlet on one side of said orifice and an outlet on the other side through which low volume hydraulic fluid passes, and an opening to the interior of said first chamber on the side of said piston opposite said partition through which high volume hydraulic system fluid is introduced to apply a pressure to said piston substantially equal to that of the hydraulic fluid in said high volume hydraulic system prior to passage of said hydraulic fluid through said first conduit means, said hydraulic motor, and said second conduit means, wherein the improvement comprises:

a backpressuring means for providing a pressure through said bleed port substantially equal to the pressure drop in said first conduit means and said second conduit means in said high volume hydraulic system.

4,685,295

CONTROL DEVICE FOR A HYDRAULICALLY OPERATED CONSUMER

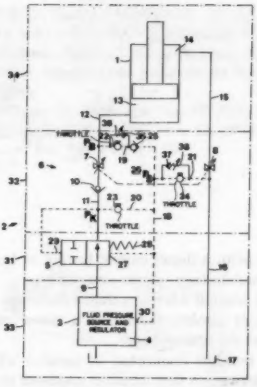
Preben Christiansen, Nordborg; Christian Eskildsen, Nybol, and Svend E. Thomsen, Langeso, all of Denmark, assignors to Danfoss A/S, Nordborg, Denmark

Filed Oct. 1, 1985, Ser. No. 782,436

Claims priority, application Fed. Rep. of Germany, Oct. 3, 1984, 3436246; Dec. 6, 1984, 3444455

Int. Cl.[4] F16D *31/02*

U.S. Cl. 60—459 **6 Claims**



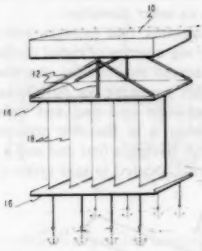
1. A control unit for hydraulically operated consumer having two operating ports, comprising inlet and outlet lines connectable to said consumer, inlet and outlet valve means respectively in said lines, pump means for supplying pressurized fluid to said inlet line, pressure regulating means at the outlet of said pump means having spring means acting thereon for controlling the output pressure thereof, a signal conduit having first and second branches connected to said inlet line on opposite sides of said inlet valve means and a third branch connected to said outlet line on the downstream side of said outlet valve means, said signal conduit means being connected to and acting on said pressure regulating means in the same sense as said spring means, said signal conduit second branch being connected to and acting on said pressure regulating means oppositely from said spring means, and three throttle means respectively in said branches to form a pressure dividing arrangement.

4,685,296

OCEAN WAVE ENERGY CONVERSION USING PIEZOELECTRIC MATERIAL MEMBERS

Joseph R. Burns, 6 Baldwin Ct., Pennington, Mercer County, N.J. 08534

Filed Jul. 21, 1986, Ser. No. 887,222
Int. Cl.[4] F03B *13/12*
U.S. Cl. 60—497 **5 Claims**



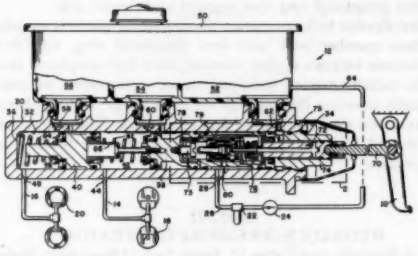
1. Apparatus for converting mechanical energy from surface waves on a body of water to electrical energy comprising a float for up and down movement in response to the waves, a prezoelectric member for converting strains thereof to electrical energy, and energy transfer means for coupling the up and down movement of said float to said member for causing alternate straining and de-straining thereof, the ouput impedance of said energy transfer means being equal to the input impedance of said member.

4,685,297

HYDRAULIC BRAKE BOOSTER WITH QUICK TAKE-UP AND FULL STROKE

Arthur K. Brown, Jr., South Bend, Ind., assignor to Allied Corporation, Morristown, N.J.

Filed Oct. 30, 1985, Ser. No. 793,021
Int. Cl.[4] B60T *13/00*
U.S. Cl. 60—547.1 **11 Claims**



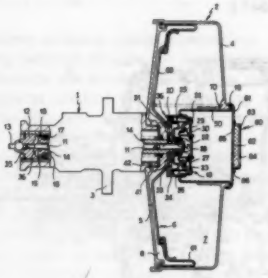
1. A brake booster having a housing with at least one outlet communicating with a brake, a piston movably disposed within the housing between a pressure chamber and a work chamber, an input assembly to control communication of fluid pressure to the work chamber wherein the fluid pressure biases the piston to move from a rest position to a braking position, a valve assembly operable in response to movement of the input assembly, and an inlet formed by the housing to communicate fluid pressure to the valve assembly, characterized in that the brake booster comprises a valve housing disposed between said piston and input assembly and the valve assembly disposed within the valve housing, the valve housing including connection means for permitting limited movement of said piston relative to said valve housing, the valve housing having an extension which extends into a recess in the piston, the extension having a closed end adjacent the piston and defining within the extension a cavity disposed at an end of the valve housing, the recess extending about the extension to define a clearance therebetween that is separate from the cavity, the connection means including a connector extending between said piston and valve housing, the connector extending through an opening in the closed end of the extension to form a slidable connection permitting the limited movement of said piston relative to said valve housing, the limited movement of the piston effecting a quick take-up of fluid losses in the brake, and the connector including an enlarged head received within the cavity, the movement of said piston relative to the valve housing effecting said take-up and an engagement of said enlarged head with the closed end of the extension for conjoint movement of the piston and valve housing.

4,685,298

SYSTEM FOR GENERATING BRAKING PRESSURE

Juan S. Bacardit, Barcelona, Spain, assignor to Bendiberica S.A., Barcelona, Spain

Continuation of Ser. No. 549,335, Nov. 4, 1983, abandoned. This application Nov. 19, 1985, Ser. No. 799,374
Claims priority, application Spain, Nov. 5, 1982, 517452
Int. Cl.[4] B60T *13/00*
U.S. Cl. 60—547.1 **3 Claims**



1. A brake control unit for an automotive vehicle, comprising:

a low pressure booster with a hermetically closed housing having two opposite walls; and

a brake master cylinder having a housing connected to a first of said opposite walls and at least a primary piston slidingly received within said master cylinder housing;

a movable piston wall dividing interiorly said closed housing into a vacuum chamber to be permanently connected to a vacuum source and a control pressure chamber adjacent said first wall of said closed housing, said piston wall being connected to said primary piston by a tubular traction member extending longitudinally through said master cylinder, said piston wall being movable axially in response to actuation of a control valve by a control rod extending slidably within said tubular traction member and having one end, opposite to said control valve, actuatable by an actuation member for actuating the unit, said control valve being arranged centrally on said movable wall and selectively controlling communication of the control pressure chamber with the atmosphere, said control valve being in permanent communication with the atmosphere via an opening formed centrally in the second of said opposite walls of said booster housing, said control valve having an annular mounting base with a central portion and a peripheral portion, and a cover attached to said peripheral portion of said mounting base and enclosing valving means operable by said control rod, said mounting base being attached by its said central portion to an end portion of said tubular traction member and

thereby retaining said piston wall on said tubular traction member, said central portion of said mounting base being screwed to said end portion of said tubular traction which extends through a central opening in said piston wall, said piston wall being retained on said tubular traction member between an external shoulder of said tubular traction member and said mounting base;

a flexible sealed conduit sealingly connecting said cover of said control valve assembly to said opening in said second wall of said closed housing;

a cover connected to said annular opening, said cover means having an inlet through which air is communicated to said annular opening and a drain port; and

filter means retained by said cover for removing contaminant particles from said air, said drain port allowing said particles to be removed to reduce saturation of said filter by the contaminants.

4,685,299

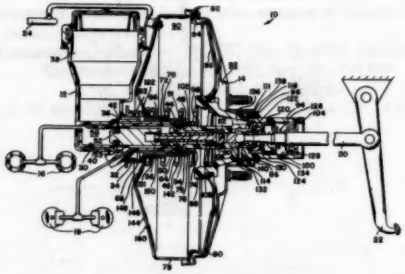
THREADED SLEEVE MEMBER FOR CONNECTING MASTER CYLINDER TO VACUUM BOOSTER

Lawrence R. Myers, South Bend, Ind., and Robert F. Gaiser, Stevensville, Mich., assignors to Allied Corporation, Morristown, N.J.

Filed Dec. 23, 1985, Ser. No. 812,585

Int. Cl.[4] **B60T** *13/00, 11/20;* **F15B** *7/08;* **F01B** *29/00*

U.S. Cl. 60—547.1 **6 Claims**



1. In a master cylinder and vacuum brake booster combination for supplying a brake system with an operational force in response to an input force, means for connecting the housing of the master cylinder with a shell of the vacuum brake booster, said connecting means comprising:

a sleeve member having an internal threaded section and an external threaded section, said housing being attached to said sleeve member through said internal threaded section, said shell being attached to said sleeve member through said external threaded section, said shell being rotated on said external threads while said sleeve is held stationary until a preset distance is produced between said housing of the master cylinder and said shell, said housing of said master cylinder and shell thereafter being held stationary and said sleeve rotated to lock said housing and sleeve together and thereby maintain said preset distance.

4,685,300

SEAL MEANS FOR A MASTER CYLINDER

John E. Steer, South Bend, Ind., assignor to Allied Corporation, Morristown, N.J.

Filed Mar. 3, 1986, Ser. No. 835,833

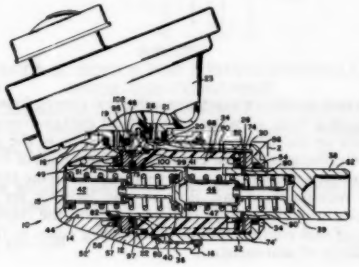
Int. Cl.[4] **B60T** *11/20*

U.S. Cl. 60—562 **12 Claims**

1. In a master cylinder having a sleeve for positioning seal means within a bore of a master cylinder housing and first and second pistons located in first and second chambers formed in the bore, said seal means engaging said first and second pistons and controlling communication between a source of fluid and said first and second chambers, said first and second pistons responding to an input force by moving to pressurize fluid within said first and second chambers, said pressurized fluid acting on and radially moving said sleeve within said bore, the improvement wherein said seal means comprises:

a first annular retainer located adjacent a first end of said sleeve, said first annular retainer having a plurality of radial slots that form a first extension of a flow path between the source of fluid and the first chamber and a groove located on its inner diameter;

a first annular base member that engages said first piston, said first piston having a series of radial openings located adjacent an end thereof in the first chamber, said first annular base member engaging the peripheral portion of said first piston between said end and radial openings when said first piston is in the rest position, said first annular base member having a first end and a second end, said second end being located in said groove of said first



annular retainer, said second end of said first annular base member controlling fluid flow communication through the radial openings to the first chamber, said radial openings in said first piston moving from alignment with said radial slots and past said second end of said first annular base member during pressurizing of fluid in said first chamber, said pressurized fluid acting on said first end of said base member to form a tight seal between said base member and first piston;

a first peripheral ring that engages said sleeve; and

a first flexible bellows section that connects said first annular base member with said first peripheral ring, said first flexible bellows section allowing said first peripheral ring to radially expand with said sleeve to provide a substantially constant engagement force between said peripheral ring and sleeve to assure that pressurized fluid is retained in said first chambers as the fluid pressure therein increases.

4,685,301

HYDRAULIC PRESSURE GENERATOR

Juan S. Bacardit, and Carlos M. Folch, both of Barcelona, Spain, assignors to Bendiberica S.A., Barcelona, Spain

Continuation of Ser. No. 729,842, May 2, 1985, abandoned. This application Sep. 17, 1986, Ser. No. 910,287

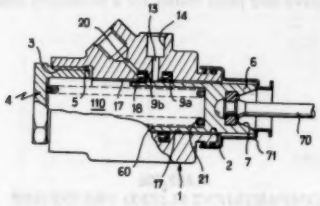
Claims priority, application Spain, May 22, 1984, 532679

Int. Cl.[4] **B60T** *11/20*

U.S. Cl. 60—562 **24 Claims**

1. A hydraulic pressure generator, comprising a single piece housing formed with a bore having a cylindrical inner wall of constant inner diameter, a first piston having a smooth peripheral surface slidably engaging said inner wall and movable relative to a first pair of axially spaced fixed sealing rings fastened in annular grooves of the inner wall, said piston having a front portion delimitating in said bore a first pressure chamber communicating permanently with a hydraulic circuit via an outlet passage, an inlet passage opening into said bore between said annular grooves and connected to a fluid feed

reservoir, and longitudinal slots formed in said cylindrical inner wall and extending axially between said inlet and outlet orifices, the longitudinal slots each having a width less than the circumference of said bore, the improvement wherein the bore extends from a first opening at one end of the housing to an enlarged diameter section at the other end of the housing, said longitudinal slots formed continuously so as to extend axially over the entire length of the bore from the first opening to the enlarged diameter section, said first pressure chamber closed



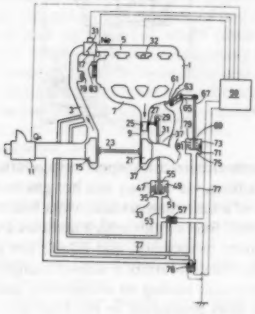
by a separate obturator member secured in the enlarged diameter section of said housing, and said outlet passage formed partly by a radially outermost portion of one of said annular grooves which communicates with said pressure chamber via at least one of said longitudinal slots, the outlet passage communicating with a portion of the one annular groove which communicates with the one slot free of any obstruction by the respective sealing ring so that fluid flows freely past the sealing ring without obstruction thereby.

4,685,302

CONTROL SYSTEM FOR VARIABLE GEOMETRY TURBOCHARGER

Toshimi Abo, Yokohama; Takashi Ueno, and Akio Sumizawa, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Kanagawa, Japan

Filed Apr. 3, 1985, Ser. No. 719,537
Claims priority, application Japan, Apr. 4, 1984, 59-65696
Int. Cl.[4] F02B *37/00*
U.S. Cl. 60—602 **16 Claims**



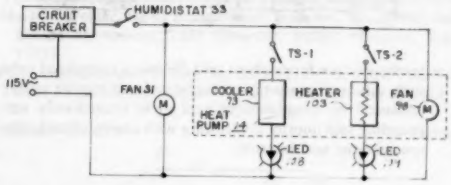
1. A control system for a variable geometry turbocharger for an internal conbustion engine including a turbine having a variable area inflow passage, said turbine being operated in response to an exhaust gas flow supplied through said variable area inflow passage, and a compressor adapted to be driven by said turbine; said control system comprising means for detecting operating conditions of said engine, a control means including arithmetic means which calculates a first control value for controlling the cross-sectional area of the variable area inflow passage to provide a suitable supercharging pressure of intake air supplied to said engine in response to said detected operating conditions of said engine, a first variable geometry valve means for changing the cross-sectional area of the variable area inflow passage, means for actuating the variable geometry valve means in accordance with said first control value; and a limiter means for changing said first control value so as to restrict a reduction of the cross-sectional area of said variable area inflow passage when the calculated control value has reached a predetermined value after being changed to reduce the cross-sectional area of the variable area inflow passage.

4,685,303

DISC DRIVE ISOLATION SYSTEM

Joseph R. Branc, Wickliffe; Thomas J. Merchant, Willoughby; William L. Miller, Chagrin Falls, and Philip J. Pisczak, Novelty, all of Ohio, assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.

Filed Jul. 15, 1985, Ser. No. 754,618
Int. Cl.[4] F25B *21/02*; G11B *15/18*
U.S. Cl. 62—3 **7 Claims**



1. A disc drive isolation system, comprising:

a disc drive isolation module for sequestering a disc drive from vibration and shock applied to the module;

an environment control enclosure having an interior in which the disc drive isolation module is disposed and an exterior, said enclosure including:

a heat pump mounted to the enclosure including a solid state thermo-electric element for cooling the interior of the enclosure in and around the disc drive;

first temperature sensing means mounted to the disc drive for controlling the cooling means, said first temperature sensing means actuating the cooling means when the sensed temperature rises above a cooling temperature;

second temperature sensing means mounted to the disc drive for controlling the disc drive, said second temperature sensing means setting an upper limit and a lower limit on the range of temperatures within which the disc drive will operate, said upper limit being higher and said lower limit being lower than the cooling temperature;

thermal insulation means lining the enclosure to resist heat flow to and from the interior of the enclosure;

sealing means to seal the interior from the exterior of the enclosure to limit air leakage; and

humidity sensing means within the interior of the enclosure to control the cooling means in response to the sensed humidity of the interior air.

4,685,304

METHOD AND APPARATUS FOR FORMING CUBE OF FROZEN LIQUID

Robert A. Essig, 3802 Zane Ave. North, Crystal, Minn. 55422

Filed Feb. 13, 1986, Ser. No. 829,449
Int. Cl.[4] F25C *1/20*
U.S. Cl. 62—68 **7 Claims**

7. A method for forming a monogrammed cube of ice from water containing impurities which cloud an ice cube formed from the water if the impurities are not washed from the ice cube during its formation, the method comprising:

forming a die of conductive material having a shape corresponding to a shape of a desired imprint to be formed in said cube;

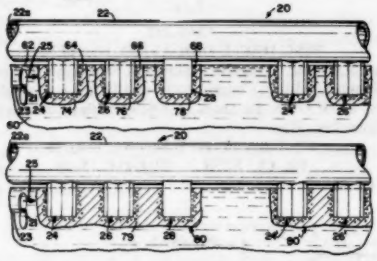
conductively connecting said die to a source of a coolant;

immersing said die within liquid water;

cooling said die with said coolant to a temperature below a

freezing point of the water with said water forming ice crystals around said die;

agitating said water at a rate selected to wash impurities away from ice forming on said cube and spaced from said die and leaving impurities within ice forming adjacent said die



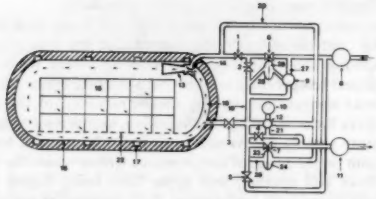
whereby said ice forms about said die into a completed cube with a desired imprint in said cube and said imprint visibly enhanced by cloudiness of said cube immediately surrounding said imprint contrasting with clarity of said cube spaced from said imprint.

4,685,305

HYPOBARIC STORAGE OF RESPIRING PLANT MATTER WITHOUT SUPPLEMENTARY HUMIDIFICATION

Stanley P. Burg, 3770 Kent Ct., Miami, Fla. 33133

Filed Sep. 26, 1985, Ser. No. 780,636
Int. Cl.[4] F24F *3/16*
U.S. Cl. 62—78 **20 Claims**



1. A method of preserving respiring plant matter comprising:

placing said matter in a vacuum chamber having walls enclosing a storage space, whereby said plant matter respires to produce respiration products including moisture which helps develop an essentially saturated air environment at subatmospheric pressure in said storage space,

controlling the temperature of said chamber so that said matter is between minus 1 degree Celsius and plus 16 degrees Celsius,

simultaneously evacuating said chamber at a regulated rate to control the pressure within said storage space to a subatmospheric pressure and to remove a portion of said air and said respiration products including said moisture from said storage space,

simultaneously recirculating said air and said respiration products between said storage space and an air mixing means within said vacuum chamber at a regulated rate,

simultaneously adding expanded atmospheric air to said air mixing means at a regulated air intake rate to mix said expanded atmospheric air with said recirculating air and said recirculating respiration products at a regulated mixing rate to form a resulting mixture,

simultaneously releasing said resulting mixture from said air mixing means to said storage space at a regulated rate to control the pressure in said vacuum chamber to a pressure between 5 and 400 mm HgA,

simultaneously circulating said resulting mixture within said storage space at a controlled recirculation rate, and

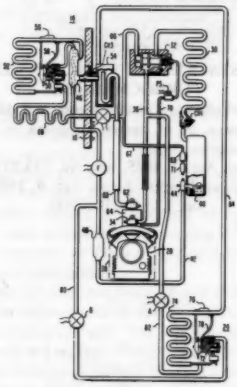
correlating said controlled temperature with said controlled pressure, said regulated evacuation rate, said regulated air intake rate, said regulated mixing rate and said controlled recirculation rate depending on the weight, respiration rate and type of said plant matter in said vacuum chamber, to preserve said plant matter for a prolonged time.

4,685,306

COMPARTMENTALIZED TRANSPORT REFRIGERATION SYSTEM

Leland L. Howland, Belle Plaine, and Jayaram Seshadri, Minneapolis, both of Minn., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 6, 1986, Ser. No. 915,601
Int. Cl.[4] F25B *5/00*
U.S. Cl. 62—117 **8 Claims**



1. In a compartmentalized transport refrigeration system, a method of controlling, via cooling and hot gas heating modes, the temperature of a first compartment via a host refrigeration unit having a closed fluid circuit which includes a compressor, condenser, receiver, evaporator, and liquid, hot gas and suction lines, and the temperature of a second compartment via a remote evaporator unit having an evaporator, and liquid, hot gas, and suction lines connected to the host unit, comprising the steps of:

controllably connecting the liquid and and hot gas lines of the remote unit to the liquid and hot has lines, respectively, of the host refrigeration unit, to control the temperature of the second compartment by cooling, null and heating modes of the remote evaporator unit,

controlling the temperature of the first compartment by cooling and null modes of the host unit, as required, when the remote unit is in a heating mode,

and controlling the temperature of the first compartment by only cooling and heating modes of the host unit when the remote unit is in null, including the step of forcing the host unit into a heating mode when the host unit would otherwise be in null.

4,685,307

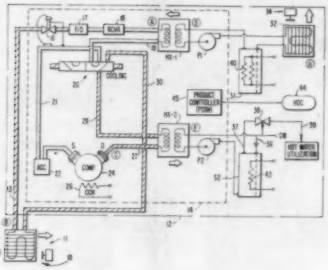
RESIDENTIAL HEATING, COOLING AND ENERGY MANAGEMENT SYSTEM

Richard D. Jones, Springfield, Va., assignor to UHR Corporation, Alexandria, Va.

Division of Ser. No. 635,140, Jul. 27, 1984, Pat. No. 4,645,908. This application Jul. 25, 1986, Ser. No. 889,512

Int. Cl.[4] F25B *13/00*

U.S. Cl. 62—160 **9 Claims**



1. An air-to-water-to-air heat pump system for heating and cooling the interior of a residence comprising the combination of

a first refrigerant-to-fluid heat exchanger having separate refrigerant and fluid paths therein in heat exchange relationship;

a second refrigerant-to-water heat exchanger having separate refrigerant and water paths therein in heat exchange relationship;

a refrigerant circuit including

a refrigerant-to-air heat exchanger located outside of the residence and having a refrigerant path in heat exchange relationship with ambient air;

a refrigerant compressor, an expansion device and a four-port reversing valve means;

first conduit means for connecting said refrigerant path of said refrigerant-to-air heat exchanger, said expansion device and said refrigerant path of said first refrigerant-to-fluid heat exchanger in series relationship between first and second parts of said reversing valve; and

second conduit means for connecting said compressor and the refrigerant path of said second refrigerant-to-water heat exchanger in series relationship between third and fourth ports of said reversing valve;

a first fluid circuit including

a fluid-to-air heat exchanger and a first fluid storage means; and

third conduit means for connecting said fluid path of said first refrigerant-to-fluid heat exchanger, said first fluid storage means and the fluid path of said fluid-to-air heat exchanger in a closed loop series path; and

a water circuit including

a second fluid storage means comprising a water storage tank;

fourth conduit means for connecting said second tank and the water path of said second refrigerant-to-water heat exchanger in series relationship;

means for connecting an external water source to said water circuit between said second tank and said second refrigerant-to-water heat exchanger;

a hot water distribution system connected to said second tank;

means selectively operable for flowing air through said fluid-to-air heat exchanger and to a plurality of areas in said interior of said residence for conditioning said areas and for returning air from said plurality of areas to said fluid-to-air heat exchanger; and

means for sensing the temperature of the return air entering said fluid-to-air heat exchanger from said plurality of areas and for controlling the operation of said selectively operable means.

4,685,308

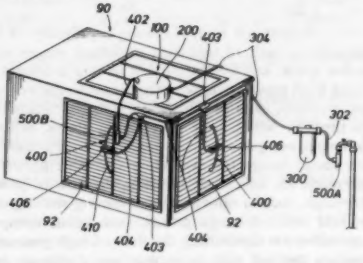
TEMPERATURE RESPONSIVE COOLING APPARATUS

Mark L. Welker, 13742 Rampchester, Houston, Tex. 77015, and Robert M. Stearns, 1335 Silverado, #2502, Houston, Tex. 77077

Continuation-in-part of Ser. No. 626,661, Jul. 2, 1984, Pat. No. 4,542,627. This application Nov. 30, 1984, Ser. No. 676,653

Int. Cl.[4] F28D *3/00*

U.S. Cl. 62—171 **20 Claims**



1. A temperature responsive cooling apparatus for an air conditioner or refrigeration system in operative association with a reservoir of fluid, the air conditioner or refrigeration system having an air cooled coil and means for producing a current of air for cooling the coil, the temperature responsive cooling apparatus comprising:

(a) means for transferring the fluid from said reservoir to the air conditioner temperature responsive cooling apparatus,

(b) a fluid control device activated by the current of air for cooling the coil, said fluid control device having a pressure responsive means to modulate the pressure of the fluid from the reservoir, for directly engaging the flow of and the pressure of the fluid for restricting the flow of fluid therethrough when the means for producing the current of air for cooling the coil is not operative and for permitting the flow of fluid therethrough when the means for producing the current of air for cooling the coil is operative,

(c) a temperature activated, nonelectrical device for terminating and initiating the flow of fluid therethrough in an intermittent fashion for enhancing the operability of the compressor associated with the refrigeration system and for reducing the quantity of fluid required to cool the coil of the refrigeration system,

(d) a fluid treatment device for preventing, reducing or mitigating the deposition of nonevaporative components on the air cooled coil, and

(e) means for dispersing the fluid to the air cooled coil from said fluid control device for cooling the coil and increasing the efficiency of the air conditioner thereby reducing the cost of operating and maintaining the air conditioner without damaging the air conditioner and without the deposition of nonevaporative components thereupon.

4,685,309

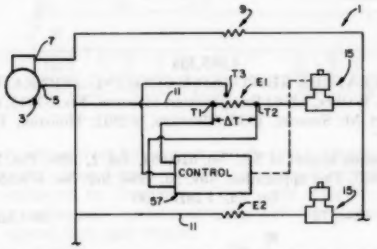
PULSE CONTROLLED EXPANSION VALVE FOR MULTIPLE EVAPORATORS AND METHOD OF CONTROLLING SAME

Joseph L. Behr, St. Louis, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Continuation of Ser. No. 643,250, Aug. 22, 1984, Pat. No. 4,578,534, which is a continuation of Ser. No. 438,360, Nov. 1, 1982, abandoned. This application Jan. 24, 1986, Ser. No. 822,192

Int. Cl.[4] F25B *41/00*

U.S. Cl. 62—212 **1 Claim**



1. In a refrigeration system having a plurality of heat exchange means, each of said heat exchange means serving a respective space, said system further having a compressor for supplying high pressure liquid refreigerant to each of said heat exchange means, each of said heat exchange means having a length through which said refreigerant flows, wherein the improvement comprises: means associated with each of said heat exchange means for expanding said refreigerant passing therethrough, for selectively blocking the flow of refreigerant therethrough, and for effectively preventing starting or flooding of said heat exchange means, said means comprising a solenoid valve for controlling the flow of high pressure liquid refreigerant through said respective heat exchange means so that said liquid refreigerant is in heat transfer relation with substantially the entire length of said heat exchange means and so that only vaporized refreigerant exists only in the last increment of said heat exchange means thereby to maximize the heat transfer efficiency of said heat exchange means, and sample and hold means for controlling said solenoid valve, said control means having means for sampling a control parameter on an instanteous basis and means for changing the ratio of the open time to the closed time of said solenoid valve in a selected period of time in finite steps in accordance with a predetermined programmed relationship between the instantaneous value of said control parameter and said step.

4,685,310

MULTI-PURPOSE VALVE ASSEMBLY

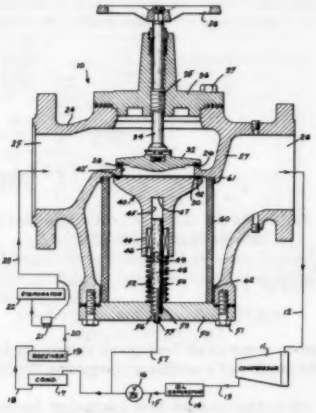
Rudolph Stegmann, Gettysburg, and Zoltan A. Mandy, Waynesboro, both of Pa., assignors to Frick Company, Waynesboro, Pa.

Filed Oct. 14, 1986, Ser. No. 918,063

Int. Cl.[4] F25B *41/04*

U.S. Cl. 62—217 **8 Claims**

1. A flow control valve for use in the suction line to a compressor of a vapor refrigeration system having a compressor discharge line to a condenser and an evaporator, comprising a valve housing having inlet and outlet passages, interior wall means within said housing intermediate said inlet and outlet passages, said interior wall means having an opening for the passage of refrigerant vapor, said interior wall means having means on the inlet passage side of the opening defining a first valve seat and having means on the outlet passage side of the opening defining a second valve seat, said valve housing having first wall means spaced from and overlying said first valve seat, a valve stem mounted for axial movement in said first wall means, means for axially moving said valve stem, a first valve member mounted on said valve stem and positioned to be moved into and out of engagement with said first valve seat, said valve housing having second wall means spaced from and underlying said second valve seat, shaft means mounted on said second wall means, a second valve member slideably mounted on said shaft means and adapted to be moved into and out of engagement with said second valve seat, means urging said second valve member into engagement with said second valve



seat, and means for applying fluid pressure to said second valve member to urge it into engagement with said second valve seat, said inlet passage being connectable to the outlet of the evaporator, said outlet passage being connectable to the suction line to the compressor, and said means for applying fluid pressure being connectable to the line between the compressor and condenser.

4,685,311

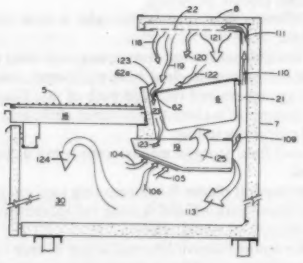
FOOD PREPARATION TABLE HAVING A REFRIGERATED INGREDIENT ZONE

Agostino A. Rastelli, Grove City, Ohio, assignor to Leitner Corporation, Columbus, Ohio

Filed Dec. 9, 1985, Ser. No. 806,672

Int. Cl.[4] F25D *23/12*

U.S. Cl. 62—258 **4 Claims**



1. A food preparation table including a means for maintaining foodstuffs in a continuous refrigerated state including:

a work surface operatively disposed above a refrigerated area providing a work zone in which food ingredients are assembled; the food preparation table including a collection pan beneath the work surface, said work surface including a series of spaced openings of predetermined size thru which food pieces will pass to the collection pan

and in which at least the bottom surface of the collection pan is refrigerated; said work surface being adjacent a refrigerated ingredient zone in which food ingredients are maintained in an accessible open relationshp with respect to the work surface;

an enclosure for the refrigerated ingredient zone adjacent said work surface; said enclosure presenting an open front facing the work surface and having a fixed top surface extending above the food ingredients and including a means for providing a circulating flow of diffused refrigerated air flowing over the top surface of the food ingredients; said means including a cooperating diffuser plate and an air duct at separate locations adjacent the ingredient zone, whereby refrigerated air will flow between the plate and duct over the food ingredients; and

a source of refrigeration for providing refrigeration adjacent the work surface and for providing the circulating flow of diffused refrigerated air over the top surface of the food ingredients in the refrigerated ingredient zone;

said work surface being the upper surface of a lower cabinet on which lower cabinet the enclosure for the ingredient zone is mounted and in which cabinet the source of refrigeration is contained in a separate zone.

4,685,312

DISK DRIVE LOCKING DEVICE

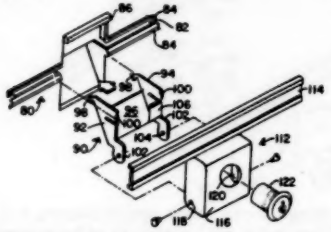
Robert P. Lakoski, Austin, Tex., and Greg F. Esakoff, Huntington Harbor, Calif., assignors to Lama Tool Company, Austin, Tex.

PCT No. PCT/US86/00113, § 371 Date Mar. 4, 1986, § 102(e) Date Mar. 4, 1986

Continuation-in-part of Ser. No. 694,269, Jan. 24, 1985, abandoned. This PCT application Jan. 24, 1986, Ser. No. 881,030

Int. Cl.[4] E05B *73/00*

U.S. Cl. 70—14 **20 Claims**



1. A portable locking device for a computer disk drive unit characterized by an elongated slot and pivotal latching mechanism, said locking device comprising:

(a) hasp means having a first and second oppositely disposed surfaces, the first surface being adapted for placement in front of the computer disk drive unit to block access to at least a portion of the disk drive unit elongated slot and render the latching mechanism substantially immobile, said hasp means further incorporating a first aperture and a first opening, said aperture and opening extending between said first and second surfaces, and

(b) hinge means for coacting with said hasp means, said hinge means having cooperating, interlocking, extension means for being received in said first hasp opening and the elongated slot of a disk drive, said extension means being slidingly receivable in a disk drive unit, said hinge means being adapted to abut at least a portion of said second hasp surface and further defining a second aperture, alignable with said first hasp aperture where said first and second apertures are adapted to receive a lock,

(c) whereby inserting said hinge means through said hasp means and into the disk drive unit, bringing the hinge means into abutment with said second hasp surface and engaging a lock through said apertures, secures said hinge and hasp means to the disk drive unit.

4,685,313

ANTI-THEFT DEVICE WITH KEY PRESENCE SECURITY

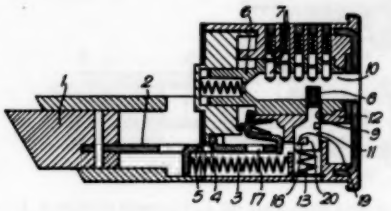
Guy Neyret, Francheville, France, assignor to Neiman, Courbevoie, France

Filed Nov. 17, 1986, Ser. No. 930,903

Claims priority, application France, Dec. 11, 1985, 85 18330

Int. Cl.[4] B60R *25/02*

U.S. Cl. 70—186 **3 Claims**



1. Anti-theft steering lock for automobile vehicle, comprising

(a) a bolt movable between locked and unlocked position,

(b) resilient means for urging said bolt towards the locked position,

(c) a key rotor for controlling the bolt on rotation of the rotor,

(d) means for retaining the bolt in the retracted position which are set out of action by withdrawal of the key, said retaining means comprising,

(e) a key sensor slidable radially in the rotor,

(f) a slide block movable in the anti-theft lock housing at right angles to the axis of the rotor, and

(g) further resilient means for urging said slide block towards the said rotor, the said slide block cooperating with the key sensor in the locking angular position of the rotor and with an aperture of a slider fast in translational movement with the said bolt, said aperture being prolonged towards the rear by a slot of narrower width, said slide block having a width slightly less than that of said slot and comprising, over a part of its height, an excess thickness of width greater than that of the said slot but less than that of the said aperture.

4,685,314

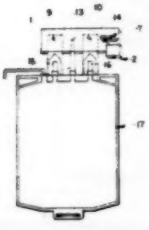
DEVICE AND METHOD FOR PREVENTING TRANSFUSION OF INCOMPATIBLE BLOOD

Tibor J. Greenwalt, and Norman A. Coe, both of Cincinnati, Ohio, assignors to University of Cincinnati, Cincinnati, Ohio

Filed Mar. 6, 1985, Ser. No. 708,707

Int. Cl.[4] E05B *65/00*

U.S. Cl. 70—57 **11 Claims**



1. A locking assembly for preventing mistransfusion of blood products from a container, said assembly comprising:

a sealing means for releasably sealing a blood product container, said sealing means including at least one interlocking element which passes through a corresponding lock-

ing aperture in said container to prevent access to the contents of said container;

a locking means for securing said sealing means in sealed position, thereby preventing withdrawal of blood products from the container; and

a releasing means for releasing said locking means and thereby permitting withdrawal of blood products from the container, said releasing means and locking means being uniquely matched to one another and identifying an Rh group of the specific type of blood product in said container.

4,685,315

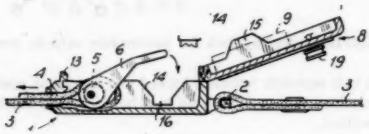
STRAP LOCK FOR SUITCASES, BAGS, OR THE LIKE

Severino Comolli, Via M. Pagano 69/A, Milan, Italy

Filed Jul. 15, 1985, Ser. No. 755,258

Int. Cl.[4] **E05B** *67/38, 73/00;* **A44B** *11/00, 11/12*

U.S. Cl. 70—68 **2 Claims**



1. A strap lock for suitcases, bags or the like having in combination therewith a strap, said strap lock comprising a box-type body having an inner surface, at least one slit, a lid, eccentric means, connection means, and at least one lever, said strap having a first end portion and a second end portion, said connection means being adapted for rigidly associating said first end portion of said strap with said box-type body, said eccentric means being rotatably journalled to said box-type body above said inner surface thereof, said slit being formed in said box-type body for permitting said second end portion of said strap to be inserted into said box type body through said slit and passed between said inner surface and said eccentric means, said lever being rigidly associated with said eccentric means and adapted for moving said eccentric means towards said inner surface for selectively releasably clamping said second end portion of said strap between said eccentric means and said inner surface, said lid being adapted for closing said box-type body and for actuating said lever, said strap lock further comprising locking means, a tab, an expansion and an opening, said locking means being adapted for releasably locking said lid in a closed position, whereat said box-type body is closed and said lever is actuated for causing said eccentric means to move towards said inner surface, for clamping said second end portion of said strap between, said eccentric means and said inner surface, said expansion being rigidly internally associated with said box-type body, said locking means comprising a safety lock and key means, said lid defining an inner face adapted for being at least temporarily located opposite to said inner surface of said box-type body, said safety lock being rigidly associated with said inner face of said lid, said key means being adapted for co-operation with said safety lock, said opening being foromed in said lid and adapted for permittng said key means to be selectively, removably inserted into said safety lock, said tab being attached to said safety lock and adapted for engagement with said expansion for releasably locking said lid in said closed position.

2. A strap lock for suitcases, bags or the like having in combination therewith a strap, said strap lock comprising a box-type body having an inner surface, at least one slit, a lid, eccentric means, connection means, and at least one lever, said strap having a first end portion and a second end portion, said connection means being adapted for rigidly associating said first end portion of said strap with said box-type body, said eccentric means being rotatably journalled to said box-type body above said inner surface thereof, said slit being formed in said box-type body for permitting said second end portion of said strap to be inserted into said box type body through said slit and passed between said inner surface and said eccentric means, said lever being rigidly associated with said eccentric means and adapted for moving said eccentric means towards said inner surface for selectively releasably clamping said second end portion of said strap between said eccentric means and said inner surface, said lid being adapted for closing said box-type body and for actuating said lever, said strap lock further comprising locking means, said locking means being adapted for releasably locking said lid in a closed position, whereat said box-type body is closed and said lever is actuated for causing said eccentric means to move towards said inner surface, for clamping said second end portion of said strap between said eccentric means and said inner surface, said locking means comprising a safety lock, having an actuation key, an expansion, and pushbutton means, said expansion being rigidly associated with said box-type body, said safety lock being rigidly associated with said lid and adapted for locking engagement relationship with said tab, said actuation key being adapted for causing selective disengagement of said tab from said safety lock, said pushbutton means being adapted for permitting engagement of said tab by said safety lock in locking engagement relationship therewith, independently of said actuation key.

4,685,316

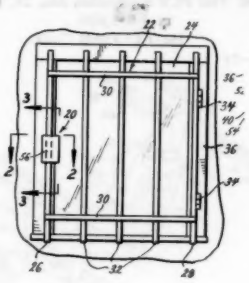
WINDOW GUARD LATCH WITH EMERGENCY RELEASE

Harry H. Hicks, 3680 Taylor, Bridgeton, Mo. 63044, and Gerald E. Davenport, 47 Gary Glen Dr., St. Peters, Mo. 63376

Filed Mar. 24, 1986, Ser. No. 843,036

Int. Cl.[4] **E05B** *47/02, 65/10;* **E05F** *15/20;* **E06B** *3/68*

U.S. Cl. 70—256 **20 Claims**



1. A window guard latch for securing a guard over a window, the window guard latch comprising:

a bracket;

a channel in the bracket for receiving a portion of the window guard;

a lock unit in said bracket, the lock unit including a lock for engaging the portion of the window guard received in the channel in the bracket; and,

means for releasing the engagement between the lock and window guard in response to an RF signal transmitted from a remote source.

4,685,317

FRANGIBLE SEAL

Norman B. DeWalch, 1213 West Loop North, Suite 180, Houston, Tex. 77055

Filed Sep. 19, 1986, Ser. No. 909,751

Int. Cl.[4] **E05B** *39/02*

U.S. Cl. 70—440 **7 Claims**

1. A frangible seal for use in a generally cylindrical hole having internal protrusions therein including:

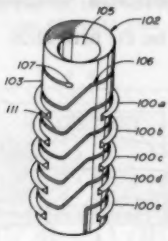
A. a tubular body have a lower end and an upper end,

B. at least one tooth extending from the outer surface of the body,

C. the tooth being tapered from the body on the lower end side of the tooth to a greater distance from the body on the upper end side of the tooth,

D. a tear starting hole in the body above the tooth and near the upper end of the body,

E. a score line extending from the hole, about the body to the lower end, and



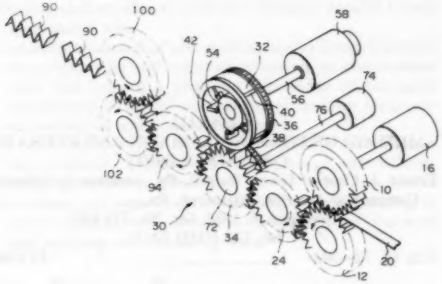
F. the body being made of a tearable and pliable material whereby when the seal is inserted into a cylindrical hole it is held there by the tooth engaging the protrusions, and is removed when the upper end is grasped and pulled, a tear starting at the hole and the body of the seal unravelling along the score line as it is removed from the cylindrical hole.

4,685,318

ROTARY CUTTER FOR CUTTING A CONTINUOUS CORRUGATED STRIP

Masahiro Ueda, Chiryu; Kohei Hakamata, Toyota, and Seigo Tsuchiya, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 31, 1985, Ser. No. 815,053
Claims priority, application Japan, Jan. 8, 1985, 60-450
Int. Cl.[4] B21D *13/04*
U.S. Cl. 72—185 **7 Claims**



1. A rotary cutter for cutting a continuous corrugated strip into strip sections having various lengths, which comprises:

a frame;

a rotary drum mounted for rotation on said frame and having at least one radial slot therethrough extending in the axial direction;

means for rotating said rotary drum;

at least one reciprocative cutter blade having a cutting edge at its outer end, said reciprocative cutter blade being slidably received in said radial slot for movement between a retracted position in which said cutting edge is retracted substantially within the confinement of the outer circumference of said drum and a projected position in which said cutting edge is protracted radially outward beyond the outer circumference of the rotary drum;

means for biasing said reciprocative cutter blade toward said retracted position;

a rotary cam mounted on said frame for rotation inside of said drum coaxially therewith, said rotary cam having a cam nose engageable with an inner end of said reciprocative cutter blade to urge said cutter blade radially outward into said projected position;

a toothed counterwheel mounted on said frame adjacent to said rotary drum for rotation in synchronization with said rotary drum, said counterwheel having teeth positively engageable with the continuous corrugated strip;

at least one fixed cutter blade secured to the outer periphery of the counterwheel at an angular position to cooperate with said reciprocative cutter blade;

drive means for rotating said rotary cam; and

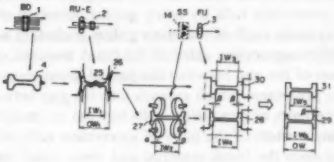
control means for controlling said drive means in such a manner that, during the non-cutting mode of operation of the rotary cutter, the rotary cam is rotated in synchronization with the rotary drum, with the cam nose being angularly offset from the inner end of said reciprocative cutter blade, thereby allowing the rotary drum and the counterwheel to rotate without cutting the corrugated strip, and that, during the cutting mode of operation, the rotary cam is rotated in synchronization with said rotary drum, with the cam nose engaging the inner end of the reciprocative cutter blade for at least a rotational angle of said rotary drum and said counterwheel, wherein said reciprocative cutter blade is facing said fixed cutter blade, thereby projecting said reciprocative cutter blade radially outward into engagement with the associated fixed cutter blade to cut the corrugated strip.

4,685,319

ROLLING METHOD AND APPARATUS FOR FORMING SECTIONS HAVING FLANGE

Koshiro Aoyagi; Taneharu Nishino, and Kenji Betsuki, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

PCT No. PCT/JP84/00226, § 371 Date Jan. 2, 1985, § 102(e) Date Jan. 2, 1985, PCT Pub. No. WO84/04263, PCT Pub. Date Nov. 8, 1984
PCT Filed May 4, 1984, Ser. No. 693,267
Claims priority, application Japan, May 4, 1983, 58-77391
Int. Cl.[4] B21B *1/08*
U.S. Cl. 72—234 **14 Claims**



1. A method of using pairs or rolls for forming blanks, traveling along a linear path between the nip of each pair, into sections having a web connected to at least one edge flange, the step comprising:

between two optional steps of roughing, intermediate and finishing steps, wherein the axes of the roll pairs are parallel and lie in a plane perpendicular to the web transversely perpendicular to the path, engaging the inner side of the flange by a surface of revolution side face of one of a pair of short sizing rolls the axes of which lie in a common plane perpendicular to the web and inclined upstream of the path at a predetermined angle θH greater than zero relative to the planes of the parallel roll pairs to exert a force to expand the web transversely of the path.

4,685,320

METHOD OF ROLLING STEEL RODS AND WIRES WITH GROOVELESS ROLLS AND GROOVELESS ROLLING ENTRY GUIDE

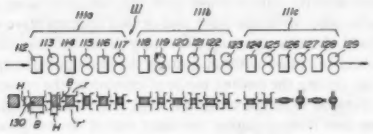
Tadaaki Yanazawa; Teruaki Tanaka; Akio Noda; Ryo Takeda, and Masataka Inoue, all of Kurashiki, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

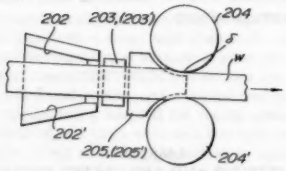
Continuation of Ser. No. 662,549, Oct. 19, 1984, abandoned, which is a continuation of Ser. No. 378,110, May 14, 1982, abandoned. This application Oct. 10, 1986, Ser. No. 918,603

Claims priority, application Japan, Aug. 5, 1981, 56-122604; Oct. 31, 1981, 56-173704

Int. Cl.[4] B21B *1/18, 39/10*

U.S. Cl. 72—250 3 Claims





1. A method of producing steel rods and wires by grooveless rolling obtaining high elongation efficiency and stable rolling, which method comprises passing blank material of rectangular cross-section through gaps set between pairs of grooveless rolls which form a series of continuous rolling mills, setting the gaps so that the ratio between the longer side and the shorter side of the cross-section of the blank material passing through the gaps is less than 1.5, the number of passes of the blank material wherein the aspect ratio is less than 1.5 being more than 30% of the total number of grooveless rolling passes, introducing the blank material into the gaps set between the pairs of grooveless rolls by entry guides provided at each of the rolling mills, each of the entry guides including adjustable guide rollers supporting sides of the blank material on an entrance side of the gap between the pair of grooveless rolls and a bill-like projection which extends into the gap between each pair of the pairs of grooveless rolls beyond an imaginary line connecting centers of the pairs of grooveless rolls with clearances between the blank material and inner relief surfaces of said bill-like projection in opposition to the blank material being between 1 and 5 mm, so as to prevent the blank material from twisting in conjunction with the supporting of the guide rollers at the entrance side of the gap, subjecting the blank material to reduction of the cross-sectional area thereof by the grooveless rolls under a rolling condition limiting the ratio of roll diameter D of each pair of grooveless rolls to the gap H therebetween according to the gap H and satisfying the relationship expressed by $D/H \leqq (100/H)+5$ so as to effectively restrain widening of the blank material being rolled, achieving high elongation efficiency and enabling stable grooveless rolling, and subjecting the sectionally reduced blank material to finishing caliber rolling through passes, not more than four passes and not less than two passes, so as to obtain the ultimate shape of the rods and wires.

4,685,321

METHOD OF DRAPE DRAWING A SHADOW MASK FOR A COLOR DISPLAY TUBE

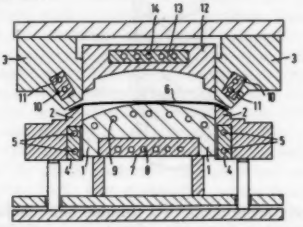
Adrianus H. M. van den Berg, and Kathryn C. Thompson-Russell, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 23, 1985, Ser. No. 779,194

Claims priority, application Netherlands, Sep. 28, 1984, 8402958

Int. Cl.[4] B21D *22/20*

U.S. Cl. 72—347 2 Claims



1. A method of drape drawing, by means of a drawing process a shadow mask sheet for a color display tube consisting of a nickel-iron alloy, characterized in that prior to drawing the shadow mask sheet is annealed at a temperature between 700° and 820° C. for a period of time which is sufficient to produce complete recrystallization without grain growth of any significance, and that during the drawing process the shadow mask sheet is maintained at a temperature between 150° and 250° C. so as to bring the 0.2% proof stress of the material of the shadow mask sheet below a tensile stress of $150N/mm^2$.

4,685,322

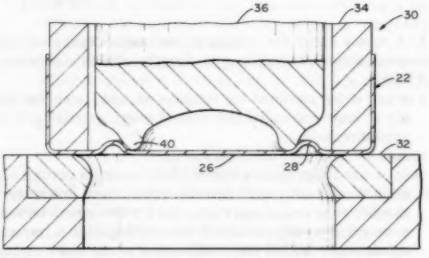
METHOD OF FORMING A DRAWN AND REDRAWN CONTAINER BODY

Ernest J. Clowes, Lower Burrell, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Sep. 3, 1985, Ser. No. 771,633

Int. Cl.[4] B21D *22/21*

U.S. Cl. 72—348 11 Claims



1. A method of forming a drawn and redrawn container body comprising providing a drawn cup having a sidewall and an end wall having an inwardly projecting bead therein and redrawing said cup into a container body having a profiled bottom end wall.

4,685,323

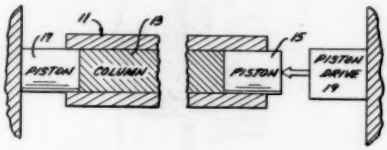
METHOD FOR INCREASING THE BUCKLING LOAD CAPACITY AND THE COMPREHENSIVE AND TENSILE PROPERTIES OF A COLUMN

Laszlo Javorik, Oregon, Ill., assignor to Grotnes Metalforming Systems, Inc., Chicago, Ill.

Continuation of Ser. No. 574,282, Jan. 26, 1984, abandoned. This application Dec. 13, 1985, Ser. No. 808,669

Int. Cl.[4] B21J *5/06*

U.S. Cl. 72—354 **18 Claims**



1. A method for increasing the compressive and tensile proportionality limits, elastic limits and yield strengths of an elongated structural member, said method comprising the steps of:

providing an elongated structural member having a lengthwise dimension that substantially exceeds any transverse cross-sectional dimension of said member, said member having at least one outer longitudinal surface;

providing an encasement having an inner longitudinal surface that corresponds to and substantially conforms to each outer longitudinal surface of said member;

confining said member within said encasement so as to substantially prevent deformation of said member in all directions transverse to the longitudinal axis of said member;

applying a compressive load to said member with said load being parallel to said longitudinal axis;

increasing said load to a magnitude greater than the original compressive elastic limit of said member;

allowing said member to yield in a direction parallel to said longitudinal axis;

producing, as a result of said yielding, a smoothing of surface irregularities on said longitudinal surface of said member such that there is a general conformance of the outer longitudinal surface of said member to the inner longitudinal surface of said encasement, and

(b) a thickening of thin areas in the member's cross-section thus producing a more even distribution of material over the length of the member; and

preventing said member from buckling or from bending in all of said transverse directions throughout the course of said applying and increasing steps.

4,685,324

FLOWMETER HAVING A THERMORESISTANT ELEMENT AND ITS CALIBRATION PROCESS

Guy Bourdon, Le Chesnay, and Dominique Lampin, Fontenay-aux-Roses, both of France, assignors to L'Air Liquide, Paris, France

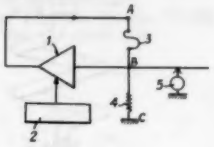
Filed Dec. 5, 1985, Ser. No. 805,446

Claims priority, application France, Dec. 7, 1984, 84 17702

Int. Cl.[4] G01F *1/68, 25/00*

U.S. Cl. 73—3 **4 Claims**

1. A flowmeter having a hot thermoresistant element at constant temperature, said thermoresistant element having an input end and an output end and comprising a variable gain amplifier and an input connected to ground through a resistor whose resistance is constant and of low value relative to the input impedance of the amplifier, the thermoresistant element being connected between the input and an output of the variable gain amplifier, means for adjusting the value of the gain of the amplifier so as to obtain the desired value of the current in the thermoresistant element corresponding to the constant temperature it is desired to obtain and means permitting determination of the gain (Ga) at which the circuit begins to loop at ambient temperature.



4,685,325

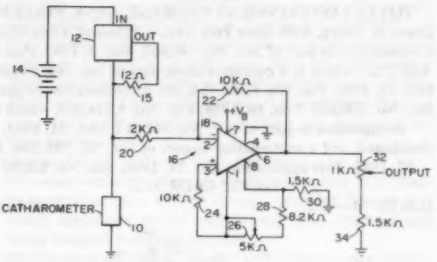
MEASUREMENT OF GAS CONTENT IN MOLTEN METAL USING A CONSTANT CURRENT SOURCE

Mark F. A. Warchol, New Kensington, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Feb. 3, 1986, Ser. No. 825,344

Int. Cl.[4] G01N *27/18*

U.S. Cl. 73—19 **3 Claims**



1. In combination;

a single catharometer cell adapted to receive a carrier gas and a second gas dissolved in a body or flow of molten metal, and to measure equilibrium between the two gases,

a source of DC voltage,

means providing constant electrical current for said cell electrically connected between the cell and the source of DC voltage, and

means for balancing electrical current flow through the cell when the cell contains only the carrier gas against said constant electrical current.

4,685,326

RESONANT DETERMINATION OF SATURATION CHANGES IN ROCK SAMPLES

Paul E. Peterson, San Mateo, Calif., assignor to Petrophysical Services, Inc., Mountain View, Calif.

Filed Mar. 10, 1986, Ser. No. 837,800

Int. Cl.[4] G01N *15/08, 5/02*

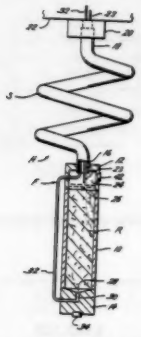
U.S. Cl. 73—38 **23 Claims**

1. An apparatus for determining saturation of a rock sample, while said rock sample is held at conditions of elevated temperature or pressure, said apparatus comprising:

(a) means for holding said rock sample, said holding means being contained within a test vessel and including means for selectively applying fluid to said rock sample while the rock sample is being held;

(b) means for applying excitation to said holding means; and

(c) means for detecting oscillation of said rock sample in response to applied excitation to ascertain the mass of the



rock sample and for determining its saturation in accordance with the mass.

4,685,327

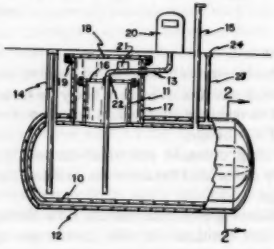
TOTAL CONTAINMENT STORAGE TANK SYSTEM

Bruce R. Sharp, 4090 Rose Hill Ave., Cincinnati, Ohio 45229

Continuation-in-part of Ser. No. 740,869, Jun. 3, 1985, Pat. No. 4,607,522, which is a continuation-in-part of Ser. No. 544,013, Oct. 21, 1983, Pat. No. 4,523,454, and a continuation-in-part of Ser. No. 580,800, Feb. 16, 1984, Pat. No. 4,524,609, which is a continuation-in-part of Ser. No. 544,012, Oct. 21, 1983, abandoned, and a continuation-in-part of Ser. No. 745,540, Jun. 17, 1985. This application Jan. 21, 1986, Ser. No. 820,027

Int. Cl.[4] G01M *3/32*

U.S. Cl. 73—49.2 **23 Claims**



1. A storage tank system having total secondary containment means comprised of:

(a) a rigid inner storage tank having a manhead for access to the interior of the tank;

(b) a sleeve attached to the rigid storage tank which encompasses the manhead, said sleeve having a cover which forms a water-tight seal and an opening through which a dispensing line passes;

(c) a dispensing line extending through the opening in the sleeve in a sealed fashion and then through the storage tank to the interior thereof for dispensing liquid from the storage tank;

(d) a jacket encasing the storage tank and extending at least to the sleeve so that a closed space exists between the storage tank and jacket whereby any leakage which occurs through the storage tank or manhead will be contained by the jacket and/or sleeve; and

(e) a leak detection means in communication with the closed space between the storage tank and jacket.

4,685,328

CAPILLARY VISCOMETER

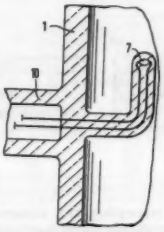
Horst Huebner, Hochheim; Guenter Tauber; Peter Hofbauer, both of Hofheim am Taunus; Roland Glatzer, Bad Schwalbach; Guenther Beintze, Mainz; Dieter Wagner, and Guenter Riege, both of Wiesbaden, all of Fed. Rep. of Germany, assignors to Schott Gerate GmbH, Fed. Rep. of Germany

Filed Feb. 5, 1986, Ser. No. 826,310

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1985, 8504764[U]

Int. Cl.[4] G01N *11/06*

U.S. Cl. 73—55 **4 Claims**



1. A viscometer including a glass tubular member in which there are two levels at which the meniscus of the liquid under test is sensed for determining the viscosity of said liquid, and the improvement comprising temperature sensitive electrical resistive elements and glass fused onto said elements to form a complete hermetic seal about said elements, the glass on said elements being fused onto said glass tubular member to locate said elements, respectively, at said levels inside of said tubular member and with only said fused-on glass exposed in said tubular member.

4,685,329

ASSESSMENT OF DRILLING CONDITIONS

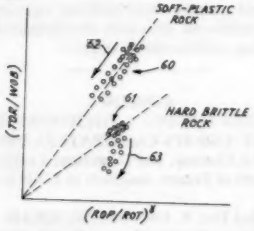
Trevor M. Burgess, Missouri City, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed May 2, 1985, Ser. No. 730,695

Claims priority, application United Kingdom, May 3, 1984, 8411361

Int. Cl.[4] E21B *44/00, 47/00*

U.S. Cl. 73—151 **6 Claims**



1. A method of assessing drilling conditions during a hole drilling operation including the steps of:

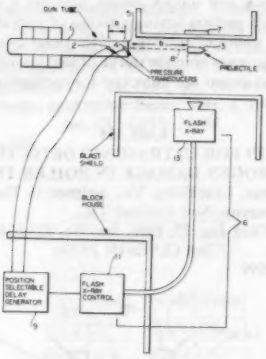
gathering measurements of torque applied (TOR), weight on bit (WOB), rate of penetration (ROP), and rotation speed (ROT);

computing the values $x=(TOR/WOB)$ and $y=(ROP/ROT)^{\gamma}$ for substantially simultaneous samples of TOR, WOB, ROP and ROT; where γ is a constant indicative of down hole geometry, building up a history of a plurality of points (x,y) in the (TOR/WOB) versus $(ROP/ROT)^{\gamma}$ plane; and monitoring trends in the history of points (x, y).

4,685,330
POSITION SELECTABLE DELAY GENERATOR FOR MECHANISM TRIGGER

Lindy R. Ford, 7900 S. Phillips Ave., Yuma, Ariz. 85364

Filed Mar. 12, 1986, Ser. No. 841,380
Int. Cl.[4] G01P *3/64*
U.S. Cl. 73—167 12 Claims



1. A system for producing an electrical signal at a preselected location along the path of a moving object, having a substantially constant velocity, said system comprising:

first sensing means located along said path for detecting the presence of said object at a first location and producing a resultant first signal;

second sensing means located at a preselected distance from said first sensing means for detecting the presence of said object at a second location and producing a resultant second signal;

counting means having respective first and second inputs connected to said first and second signals;

frequency means connected to a third input of said counting means for providing a preselected undivided frequency thereto;

frequency dividing means connected between said output of said frequency means and a fourth input of said counting means;

said counting means counting from an initial count value at said frequency from the occurrence of said first signal until the occurrence of said second signal, corresponding to the object velocity, said second signal initiating count down at said divided frequency, said counting means generating an output signal when the count returns to said initial count value;

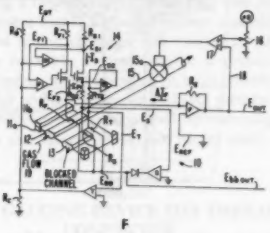
means for generating said electrical signal in response to said output signal produced by said counting means, indicative of the presence of said moving object at said preselected location along the path; and

means located at said preselected location for instantaneously monitoring the presence of said object thereat, whereby the divided frequency is adjustable to cause countdown to the initial count when said moving object arrives at said second location, causing said output signal to be produced when said object reaches said preselected location, regardless of the object velocity between said first and said second locations.

4,685,331
THERMAL MASS FLOWMETER AND CONTROLLER

Wayne G. Renken, San Jose; Dan B. LeMay, Palos Verdes Estates, and Ricardo M. Takahashi, Ben Lomand, all of Calif., assignors to Innovus, San Jose, Calif.

Filed Apr. 10, 1985, Ser. No. 721,535
Int. Cl.[4] G01F *1/68*
U.S. Cl. 73—204 3 Claims



F

1. A mass flow meter comprising:

a semiconductor body having an elongate flow channel extending therethrough and a stagnant gas channel extending into said body;

a thin film first, self-heated, single element flow sensor suspended in said flow channel in said body;

a thin film stagnant, self-heated, single element flow sensor suspended in said stagnant gas channel in said body;

a body temperature sensor attached to said body adjacent to said flow sensors for providing an indication of the temperature of inlet gas flow in said flow channel to said first flow sensor and providing a body wall ambient reference temperature for said first flow sensor and said stagnant flow sensor; and

in which said semiconductor body comprises:

a first semiconductor substrate having an etched flow channel extending on a surface thereof, said first flow sensor being suspended across said etched flow channel and being integral with said substrate;

a first stagnant gas channel in said first substrate and extending parallel to said etched flow channel, said stagnant gas channel being connected to said inlet gas flow and including end wall means in said body for blocking flow of inlet gas through said stagnant gas channel; and

a second substrate having a gas flow channel and a stagnant gas channel spacedly extending on a surface thereof, said second substrate being mounted and sealed on said first substrate such that said gas flow channels and said stagnant gas channels are aligned to form a gas flow conduit and a stagnant gas conduit, respectively, in said body.

4,685,332
LIQUID LEVEL SENSING DEVICE

Joseph T. Betterton, Arab, and Alfred H. Glover, Decatur, both of Ala., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Jul. 7, 1986, Ser. No. 882,651
Int. Cl.[4] G01F *23/36*
U.S. Cl. 73—309 5 Claims

1. A liquid level transducer for fuel tanks and the like comprising:

an elongated tubular housing having an axis and being of electrically conductive material including means for facilitating liquid flow into and out of its interior as liquid levels change thereabout;

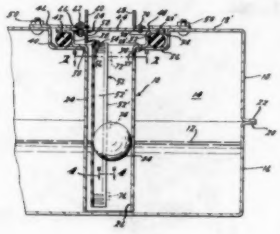
means supporting the elongated tubular housing in the liquid with the axis thereof vertically oriented;

an elongated and normally flat resistor card of relatively flexible material supported in the tubular housing;

an electrically conductive sphere within the tubular housing positioned between the resistor card and an interior sur-

face of the housing and being buoyed by the liquid to move along the surface of the resistor card in the direction of the housing axis as the liquid level changes;

the flexible resistor card having a width dimension greater than the interior dimension of the tubular housing thereby



causing the resistor card to be flexed from a normally flat configuration to a curved configuration forming a shallow channel parallel to the housing axis, whereby the sphere moves along the channel and is pressed against the housing by the resilient forces of the flexed resistor card tending to return the card to a normally flat configuration.

4,685,333

WORK STATION FOR WORKING ON WORKPIECES FOR A PLURALITY OF OPERATIONS

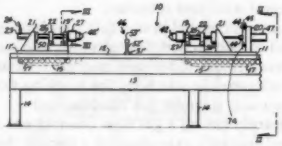
Louis D. Wilson, 646 Parkstone Way; Patrick M. Jones, 284 Spencer St., both of Folsom, Calif. 95630, and Mark Vrilakas, P.O. Box 561, West Sacramento, Calif. 95691

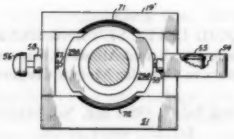
Filed Sep. 17, 1984, Ser. No. 651,176

The portion of the term of this patent subsequent to Aug. 6, 2002, has been disclaimed.

Int. Cl.[4] G01M *1/04, 1/16*

U.S. Cl. 73—478 **7 Claims**





1. In a work station for working on workpieces or the like, having a frame including a support bed, a tailstock having a tall centering device mounted on said support bed, a headstock mounted on said support bed spaced from said tailstock and having a head centering device thereon, and means on said frame for urging said tail centering device to move slidably along the central longitudinal axis through said head centering device with respect to said tailstock and toward said head centering device, the improvement which comprises:

a cage assembly mounted on said work station, a first outer bearing-mounted rotatable drum mounted in said cage assembly; a second inner rotatable drum mounted in said cage assembly coaxially within said first drum, said second drum being adapted to rotate about said axis, and

workpiece lock and unlock means associated with both said tailstock and said headstock for selectively locking a workpiece mounted on said work station between said tail and head centering devices for carrying out work operations thereon, and for unlocking said workpiece to allow said workpiece to oscillate or float with respect to said bed; said lock and unlock means being associated with said cage assembly and said drums for locking said drums in a fixed, non-oscillating position;

and said lock and unlock means includes a curved inner lower wall portion having a radius of curvature different from the radius of curvature of the outer drum, said outer drum rotating within the curve of said lower wall portion when said drums are unlocked for oscillation.

4,685,334

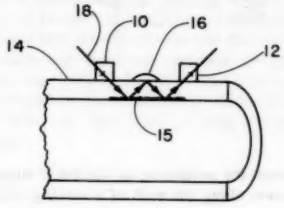
METHOD FOR ULTRASONIC DETECTION OF HYDROGEN DAMAGE IN BOILER TUBES

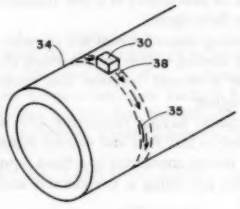
Paul J. Latimer, Lynchburg, Va., assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Jan. 27, 1986, Ser. No. 823,034

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—599 **6 Claims**





1. A method of ultrasonically testing a wall of a boiler tube for detecting hydrogen damage comprising the steps of:

providing a shear-wave angle-beam transmitting transducer with a frequency in the range of 2.5 MHz to 10 MHz at a first position on the outside surface of the boiler tube at a predetermined beam angle of forty-five degrees relative to the tube surface;

providing a shear-wave angle-beam receiving transducer with a frequency in the range of 2.5 MHz to 10 MHz at a second position on the outside surface of the boiler tube, said second position being circumferentially spaced from and aligned with said first position, and at a predetermined beam angle of forty-five degrees relative to the tube surface;

providing an adequate amount of couplant with low attenuation properties between said transducers and said outer surface of the boiler tube;

transmitting an ultrasonic pulse of shear-waves of a frequency in the range of 2.5 MHz to 10 MHz into the wall of the boiler tube from the transmitting transducer to the receiving transducer along a predetermined circumferential path;

measuring the relative attenuation of the amplitude of the received ultrasonic pulse; and

comparing the relative attenuation of the amplitude of the received ultrasonic pulse with a known reference attenuation from an undamaged tube that does not have hydrogen damage to determine the presence of hydrogen damage.

4,685,335

METHOD AND APPARATUS FOR MONITORING CRACKS OF A ROTATABLE BODY

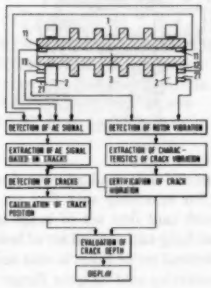
Kazuo Sato, Kitaibaraki; Kouki Shiohata, Ohmiya; Osami Matsushita, Tomobe; Katsuaki Kikuchi, Tsuchiura; Masakazu Takasumi, Juoh; Ichiya Sato, and Ryoichi Kaneko, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 471,807, Mar. 3, 1983, abandoned. This application Dec. 14, 1984, Ser. No. 681,576

Claims priority, application Japan, Mar. 3, 1982, 57-34414

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—660 **18 Claims**


DETECTION OF AE SIGNAL
DETECTION OF WATER VIBRATION
EXTRACTION OF AE SIGNAL BASED ON CRACKS
EXTRACTION OF CHARACTERISTICS OF CRACK VIBRATION
DETECTION OF CRACKS
CERTIFICATION OF CRACK VIBRATION
CALCULATION OF CRACK POSITION
EVALUATION OF CRACK DEPTH
DISPLAY

5. An apparatus for monitoring cracks of a rotatable body comprising a first pair of accoustic emission detectors attached to the rotatable body, a second pair of accoustic emission detectors attached to the bearings of the rotatable body, means for detecting cracks by extracting accoustic emission signals caused by cracks, means for calculating the position of cracks based on the time difference between the accoustic emission signals from the detectors of the first pair, means for comparing assumed vibrations with measured vibrations, means for evaluating the depth of cracks from the result of this comparison and means for displaying the cracks.

4,685,336

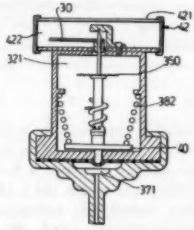
PRESSURE GAUGE

Char-Shin Lee, Pa-Cheng Li, Taiwan, assignor to Lee Wang Industry Ltd., Chiaya, Taiwan

Continuation-in-part of Ser. No. 576,032, Feb. 1, 1984, abandoned. This application Feb. 26, 1986, Ser. No. 835,440

Int. Cl.[4] G01L *7/08*

U.S. Cl. 73—715 **16 Claims**



1. An improved pressure gauge of the type in which a housing member includes a sealed chamber and an open chamber adapted to communicate with the fluid pressure to be measured; a biasing means mounted in said sealed chamber, a seat member movable with said biasing means, a rotary shaft including a lateral pin, one end of said rotary shaft being journaled in said seat member, an indicating means connected to the other end of said rotary shaft and rotatable therewith, a helix surrounding said rotary shaft, said helix being adapted to loosely engage said lateral pin on said rotary shaft, and a spiral spring providing a restoring force making the rotary shaft rotate to its initial position after being rotated, the improvement comprising a flexible member dividing said housing into said sealed chamber and said open chamber, a sensing member mounted in said sealed chamber and carried by said flexible member to be movable in response to a pressure applied thereto, said sensing member being in engagement with said seat member and adapted to move said seat member and helix and cause rotation of said rotary shaft by camming action of said helix upon said lateral pin of said rotary shaft.

4,685,337

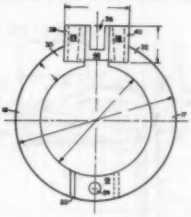
STRESS GAUGING DEVICE FOR THREADED CONNECTOR

Kristy L. Church, Box 72A, Rte. 3, Montgomery, Tex. 77356

Continuation of Ser. No. 634,182, Jul. 26, 1984, abandoned, which is a continuation of Ser. No. 333,322, Dec. 22, 1981, abandoned. This application Feb. 24, 1986, Ser. No. 833,428

Int. Cl.[4] G01B *11/20, 21/32*

U.S. Cl. 73—762 **11 Claims**



1. A device for signaling the attainment of maximum allowable hoop stress in a female threaded connector member, said stress being caused by tightening of a tapered male threaded member into said female member, comprising:

an annular body dimensioned for surrounding said female member with a firm fit therebetween, said body including two discrete complementary half sections;

pivot means for joining said half sections at one end thereof;

weak link means for rigidly joining said half sections at the otherwise free ends thereof for clamping said body firmly about said female member, said weak link means having a portion with a tensile strength less than that of said body for breaking under the application of a predetermined maximum allowable hoop stress to said female member; and

attachment means for firmly adjoining the weak link means between the half sections and permitting ready replacement of the weak link means for subsequent re-use of the device.

4,685,338

DEVICE FOR MOUNTING A RELATIVE DISPLACEMENT SENSOR ON A BEAM HAVING RADIAL LUGS

Georges L. A. Bonfils, La Chevraliere, France, assignor to S.F.E.N.A., S.A., Velizy Villacoublay, France

Filed Aug. 15, 1986, Ser. No. 896,726

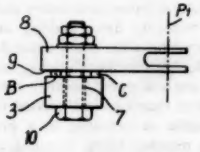
Claims priority, application France, Aug. 27, 1985, 85 12760

Int. Cl.[4] G01L *1/04, 1/00*

U.S. Cl. 73—862.62 **16 Claims**

1. A device for mounting relative displacement sensors on a beam having a longitudinal axis and two transversely-extending lugs which are spaced apart and aligned in said longitudinal axis direction, each said lug having two opposite faces which

are mutually parallel and parallel to said longitudinal axis, said faces being intended for use in mounting sensors having respective mounting bases on said faces, wherein said device comprises:



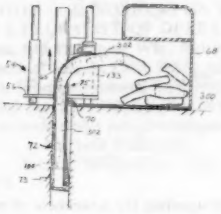
three non-aligned contact studs interposed between each bearing face of a sensor and the corresponding face of a lug, with one of said studs being closer to the beam than the other two studs.

4,685,339

SOIL SAMPLE TAKER AND VEHICLE MOUNTING ARRANGEMENT

Harry M. Philipenko, P.O. Box 294, Max, N. Dak. 58759

Filed Jun. 28, 1984, Ser. No. 625,626
Int. Cl.[4] G01N *1/08*; E21B *49/02*
U.S. Cl. 73—864.45 **13 Claims**



1. A soil sampler comprising, in combination,
a support frame adapted to be mounted on a vehicle,
a sample-taking probe supported on said frame and comprising an elongated hollow element having one side open, and a soil cutter at a bottom end thereof,
motor means mounted on said frame for driving said probe vertically downwardly into the ground and for retracting the probe upwardly from the ground to cut and withdraw a soil sample from the ground,
a sample collecting receptacle,
means for ejecting a soil sample through the open side of said probe into said receptacle during upward retracting movement of the probe,
means mounting said receptacle for movement between a first position adjacent the level of the ground, in which the sample within the probe is ejected into the receptacle, and a second position in which the receptacle and the bottom end of the probe are spaced above the ground so that there is sufficient clearance to move the vehicle to another sample taking location.

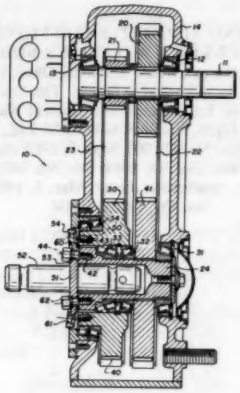
4,685,340

TWO SPEED POWER TAKE-OFF

Ryan E. Shust, and Fergus J. MacCourt, both of Winnipeg, Canada, assignors to Versatile Corporation, Vancouver, Canada

Filed Jan. 8, 1986, Ser. No. 817,276
Int. Cl.[4] F16H *37/00*
U.S. Cl. 74—11 **2 Claims**

1. A two speed power take-off assembly comprising a first drive flange operable at a first speed, a first set of bolt receiving holes in said first drive flange, a second drive flange operable at a second speed, a second set of bolt receiving holes in said second drive flange, an adaptor flange rigidly connected to a power take-off drive shaft, a first set of attachment holes in said adaptor flange, each of said holes having a first axis, a second set of attachment holes in said adaptor flange, each of said holes having a second axis, said first axis being angularly offset



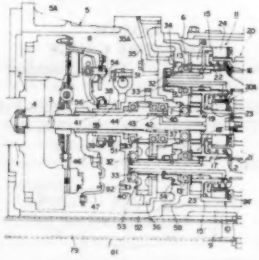
relative to said second axis, said adaptor flange defining said holes positioned for matching said first set of holes in said adaptor flange with said first set of holes in said first drive flange and for matching said second set of holes in said adaptor flange with said second set of holes in said second drive flange by reversibly positioning said adaptor flange.

4,685,341

POWER TRANSMITTING APPARATUS FOR TRACTOR

Tomiho Tanaka, Matsubara; Takashi Suzuki, and Mitsuo Watashi, both of Sakai, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Apr. 11, 1986, Ser. No. 850,326
Claims priority, application Japan, Aug. 2, 1985, 60-119467[U]; Aug. 2, 1985, 60-171592
Int. Cl.[4] F16H *37/00*
U.S. Cl. 74—15.82 **4 Claims**



1. A power transmitting apparatus for a tractor comprising:
a flywheel driven by a crankshaft of an engine,
a travel drive line defined between a running-travel main shaft (**3**) and differential means (**64'**), said running-travel main shaft being operatively connected to an engine through a running-travel clutch (**8**) related to said flywheel,
a PTO drive line defined between a PTO main output shaft (**41**) and a PTO output shaft (**69**), said PTO main output shaft being coaxially supported on said running-travel

main shaft and connected directly to said flywheel for rotation therewith,

oppositely disposed forward and backward rotation switching means disposed on opposite sides of said running-travel main shaft and operatively connected to said running-travel main shaft to rotationally control said travel drive line and said PTO drive line, said PTO drive line includes a PTO transmission shaft operatively connected to said PTO main shaft, said backward and forward rotation switching means having forward rotation clutch means and backward rotation clutch means, one of said clutch means being relatively rotatably fitted on said PTO transmission shaft,

a PTO hydraulic clutch disposed on said PTO drive line downstream of said switching means fitted on said PTO transmission shaft, and

change speed means downstream of said hydraulic clutch disposed on said PTO drive line, said change speed means being operative to provide a plurality of speeds for said PTO drive output shaft.

4,685,342

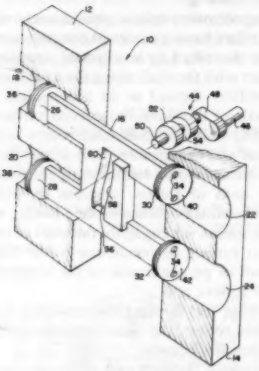
DEVICE FOR CONVERTING LINEAR MOTION TO ROTARY MOTION OR VICE VERSA

Douglas C. Brackett, Saccarrappa, Scarborough, Me. 04074

Filed May 15, 1985, Ser. No. 734,454

Int. Cl.[4] F02G *1/06*; F16H *21/18*

U.S. Cl. 74—50 **29 Claims**



1. A device for directly converting rectilinear motion to rotary motion or vice versa, comprising a rotatable crank, having a crankpin and at least two bearing members rotatably mounted alongside each other on said crankpin, and a shuttle mounted for reciprocating rectilinear movement, said shuttle including an opening extending therethrough from one side of said shuttle to an opposite side of said shuttle, said opening being sized and shaped such that said crankpin extends therethrough, and at least two bearing surfaces fixedly attached to said shuttle such that said bearing surfaces are rectilinearly and reciprocally movable conjointly with said shuttle, one of said bearing surfaces having a first end and a second end and being located adjacent one end of and to one side of said opening such that said one bearing surface is in constant engagement with one of said bearing members as said one bearing member moves back and forth along said one bearing surface and said one bearing surface only between said first and second ends thereof, said one bearing member rotating in one arcuate direction as it moves between said first and second ends of said one bearing surface in a first direction and in an opposite arcuate direction as it moves between said first and second ends of said one bearing surface in a second direction opposite to said first direction, and another of said bearing surfaces having a first end and a second end and being located adjacent an opposite end of and to an opposite side of said opening such that said another bearing surface is offset relative to said one bearing surface and is in constant engagement with another of said bearing members as said another bearing member moves back and forth along said another bearing surface and said another bearing surface only between said first and second ends thereof, said another bearing member rotating in said opposite arcuate direction as it moves between said first and second ends of said another bearing surface in said first direction and in said one arcuate direction as it moves between said first and second ends of said another bearing surface in said second direction, whereby the reciprocating rectilinear motion of said shuttle is continuously converted into the rotary motion of said crank or vice versa.

4,685,343

POWERSHIFT GEARBOX/TRANSMISSION

Friedrich J. Ehrlinger; Franz Müller; Herbert Simon, all of Friedrichshafen, and Hubert Sailer, Markdorf, all of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Friedrichshafen, Fed. Rep. of Germany

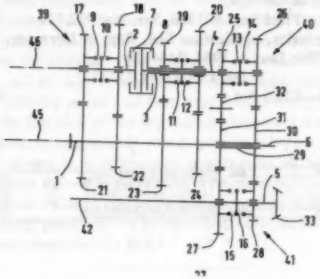
PCT No. PCT/EP84/00219, § 371 Date May 15, 1985, § 102(e) Date May 15, 1985, PCT Pub. No. WO85/01335, PCT Pub. Date Mar. 28, 1985

PCT Filed Jul. 17, 1984, Ser. No. 737,348

Claims priority, application PCT Int'l Appl., Sep. 15, 1983, PCT/EP83/00241

Int. Cl.[4] F16H *3/08*

U.S. Cl. 74—331 **8 Claims**



1. A motor-vehicle transmission shiftable under load, comprising:

a main gear set including:

a main input shaft,

respective gear trains defining two torque-transmitting paths, each of said gear trains having two selectively effective groups of gears including a gear fixed to said main input shaft and a free gear rotatable about an axis common to free gears of the other groups,

a respective coaxial secondary input shaft for each train lying along said axis and carrying rotatably the free gears of the respective train,

respective synchronizing clutches for selectively coupling one of said free gears rotatably with the respective secondary input shaft, and

a double clutch disposed along said axis between said gear trains and formed as a unit with two selectively operable clutches each adapted to connect a respective one of said secondary input shafts with a single main-gear-set output shaft coaxial with said secondary input shafts, one of said secondary input shafts being hollow and journaled on said main-gear-set output shaft;

a reversing gear set having:

a pair of free gears rotatable on a common axis,

a reversing clutch selectively coupling said free gears of said reversing gear set to select an output rotation direction of the transmission, and

fixed gears cooperating with said free gears of said revers-

ing gear set to define opposite-sense rotational directions in accordance with the free gear coupled to the reversing clutch;

a range change gear set coupled to said reversing gear set and including:

a pair of free gears rotatable about a common axis,

a range-change clutch selectively coupling said free gears of said range change gear set to select respective speed ranges in accordance with the free gear coupled to said range-change clutch, said free gears of said range change gear set cooperating with said fixed gears of said reversing gear set;

a common shaft fixed to and carrying said fixed gears of said reversing gear set and said range change gear set;

a final output shaft parallel to but offset from said common shaft, said free gears and said range-change clutch of said range change gear set being provided on one of said output shafts and said free gears and said reversing clutch of said reversing gear set being provided on the other of said output shafts; and

an output gear on said final output shaft for driving wheels of said vehicle.

4,685,344

HELICAL BALL GEARING

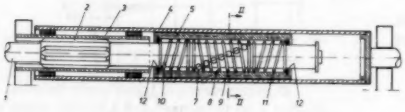
Manfred Horn, and Franz Mayer, both of Kaufungen, Fed. Rep. of Germany, assignors to Gebr. Bode & Co. GmbH, Kassel, Fed. Rep. of Germany

Filed Sep. 4, 1985, Ser. No. 772,729

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1984, 3433394; Dec. 4, 1984, 3444134

Int. Cl.[4] F16H *25/22*

U.S. Cl. 74—424.8 NA **5 Claims**



1. In a helical ball gearing for converting an axial motion into rotary motion and vice versa, of the type including a rotor having at least one helical groove, a non-rotatable, but axially displaceable shaft having at least one helical groove and being disposed at least partly within the rotor, a plurality of balls disposed in the helical grooves between the rotor and shaft, and a guide for the balls serving as a bearing for the balls, the improvement comprising:

said guide being a helical spring elastically resilient in the axial direction, said helical spring having a clockwise direction of spiral and said grooves having a counterclockwise direction of spiral as viewed from the same direction, thereby allowing the balls to shift axially within the grooves so as to reduce wear on the grooves.

3. In a helical ball gearing for converting an axial motion into rotary motion and vice versa, of the type including a rotor having at least one helical groove, a non-rotatable, but axially displaceable shaft having at least one helical groove and being disposed at least partly within the rotor, a plurality of balls disposed in the helical grooves between the rotor and shaft, and a guide for the balls serving as a bearing for the balls, the improvement comprising:

said guide being elastically resilient in the axial direction, thereby allowing the balls to shift axially within the grooves so as to reduce wear on the grooves, and

two springs disposed on opposite ends of said guide for operation in a horizontal position of the helical ball gearing so as to support said guide in position along the shaft.

4,685,345

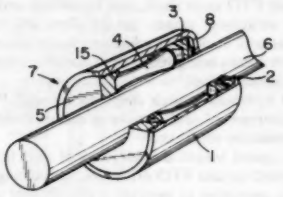
APPARATUS FOR CONVERTING ROTARY MOTION TO TRANSLATORY MOTION

Alder R. Gruss, 18 Kewanee Rd., New Rochelle, N.Y. 10804

Filed Sep. 9, 1985, Ser. No. 773,999

Int. Cl.[4] F16H *27/02*

U.S. Cl. 74—424.8 C **7 Claims**



1. An apparatus for converting motion comprising:

a cylindrical housing having a first end piece, said end piece having a centrally located hole therethrough for receiving a shaft, said housing having an attachment means at the other end;

a second end piece comprising a removable disc having a centrally located hole therethrough along the longitudinal axis thereof for receiving a shaft, said disc having an attachment means cooperable with the attachment means located on the housing;

a plurality of shaped rollers spaced equidistantly within said housing, the rollers having a curved concave surface, said curved surface described by an eliptical equation so as to provide contact with the shaft along the axial length of the rollers, said rollers skewed at an acute angle with the longitudinal axis of the shaft, the curved surface of each roller contacting only the shaft, said rollers having ends for cooperation and engagement with a race means;

at least one race means within said housing for retaining and engaging the ends of rollers, wherein the race means comprises a substantially planar surface having an inward projecting rim means for engaging the ends of the rollers, said flat planar surface perpendicular to the longitudinal axis of the shaft or perpendicular to the longitudinal axis of the skewed rollers; and

spring means within said housing for providing a compressive load on said rollers, the race means and spring means contained within the housing,

whereby a shaft inserted through said apparatus, so that said rollers are in close contact with the shaft, when rotated angularly will cause said apparatus to move in a longitudinal direction; and, angular rotation of the apparatus about the shaft will cause the shaft to move in a longitudinal direction.

4,685,346

POWER TRANSMISSION SYSTEM

George E. Brackett, Cape Elizabeth, Me., assignor to Maxaxam Corporation, Oradell, N.J.

Filed Mar. 13, 1984, Ser. No. 588,969

Int. Cl.[4] F16H *1/16, 55/10*

U.S. Cl. 74—427 **20 Claims**

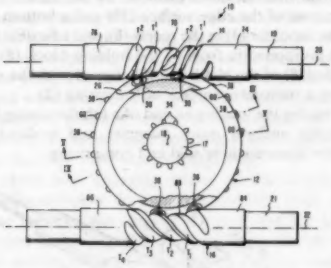
1. A worm drive system, comprising:

(a) a worm wheel mounted for rotation about a worm wheel axis of rotation;

(b) first and second sets of rollers, each of said rollers having a roller axis, and means for mounting each of said rollers on said worm wheel for rotation about its roller axis relative to said worm wheel, the roller axes of said rollers of said first and second sets being disposed in different orientations relative to said worm wheel axis of rotation so that said roller axes of said rollers of said first set extend toward one point on said worm wheel axis of rotation and said roller axes of said rollers of said second set extend

toward another, different point on said worm wheel axis of rotation; and

(c) a first worm screw having a first screw thread in mating engagement with said first set of rollers on said worm wheel and a second screw thread in mating engagement with said second set of rollers on said worm wheel, said second screw thread of said first worm screw being separate and distinct from said first screw thread of said first



worm screw, said second screw thread having a configuration different than said screw thread, said first screw thread having surfaces matching the surfaces generated by said rollers of said first set upon simultaneous rotation of said worm wheel and said first worm screw, the second screw thread having surfaces matching the surfaces generated by said rollers of said second set upon simultaneous rotation of said worm wheel and said first worm screw.

4,685,347

INDEXABLE STAR WHEEL

Phillip J. Roehrig, Rockford, and Neal R. Gray, Machesney Park, both of Ill., assignors to Amerock Corporation, Rockford, Ill.

Filed Dec. 30, 1985, Ser. No. 814,264
Int. Cl.[4] G04B *19/24*; E05F *15/10*
U.S. Cl. 74—436 **9 Claims**

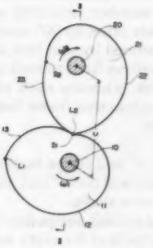
1. A star wheel rotatable about a predetermined axis and adapted to be periodically indexed by an actuating pin rotatable about a parallel axis and in a path which intersects the outer periphery of the star wheel, said star wheel being made of resiliently yieldable material and having a series of angularly spaced teeth and intervening pockets around its outer periphery, said pin being adapted to enter said pockets and bear against the flanks of said teeth during rotation of said pin whereby the pin acts to index the star wheel, one of said teeth being a wide tooth having a substantially greater angular width than the other teeth and having an outer tip located to periodically engage said pin and prevent rotation thereof, and a weakened section formed in said wide tooth only inwardly of the tip thereof and permitting the outer end portion of said wide tooth to flex inwardly when engaged by said pin, each remaining tooth of said star wheel being free of a corresponding weakened section.

4,685,348

GEAR TRANSMISSION

Akira Takami, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 6, 1986, Ser. No. 860,035
Claims priority, application Japan, May 17, 1985, 60-106524; Dec. 5, 1985, 60-275540
Int. Cl.[4] F16H *55/17*
U.S. Cl. 74—437 **5 Claims**



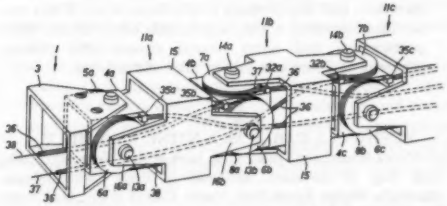
1. A gear transmission being provided with a first rotary shaft, a first non-circular gear fixed thereto, a second rotary shaft, and a second non-circular gear fixed thereto, said first non-circular gear and said second non-circular gear being continuously engageably rotated, thereby transmitting a rotational driving force between said first rotary shaft and said second rotary shaft, said gear transmission characterized in that when the absolute value $|\omega 2/\omega 1|$ of a ratio of an angular velocity $\omega 2$ of said second rotary shaft with respect to an angular velocity $\omega 1$ of said first rotary shaft is represented by $F(\theta)$ as the function of the angular displacement θ of said first rotary shaft, an engageably rotary portion where a differential value K given in a differential equation as to said angular displacement $\theta K = d \log F(\theta)/d\theta$ presents a positive or negative constant value in continuation is provided in the shape of intermeshing pitch curves of said first non-circular gear and said second non-circular gear.

4,685,349

FLEXIBLY FOLDABLE ARM

Mitsuo Wada, and Kazue Nishihara, both of Ibaraki, Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

Filed Dec. 20, 1985, Ser. No. 811,471
Int. Cl.[4] G05G *11/00*; B25J *11/00*
U.S. Cl. 74—479 **3 Claims**



1. A flexibly folding arm comprising at least two serially connected arm sections, each said arm section having a base end and a fore end and comprising:

a plurality of joint members, each having a base end and a fore end;

hollow frame bodies positioned between base and fore ends of adjacent ones of said joint members;

first connector shafts extending along a first axis for rotat-

ably connecting base ends of each said joint member with a respective one of said frame bodies;

a pair of first pulleys fixed to each of said joint members at said first axis, whereby each pair of said first pulleys rotates with a respective joint member about a respective said first axis;

second connector shafts extending along a second axis for rotatably connecting fore ends of each said joint member with a respective other of said frame bodies, said first and second axes being mutually perpendicular and mutually intersecting with respective second and first axes of an adjacent joint member, whereby adjacent ones of said joint members are offset by 90° about an axis perpendicular to a plane defined by said first and second axes;

a pair of second pulleys fixed to each of said frame bodies at said second axes, whereby each of said second pulleys rotates with a respective frame body about a respective said second axis;

a stationary base;

an additional one of said frame bodies rotatably connected between said base and one of said joint members by one of said first connector shafts;

a first wire wound around one pulley of both of said pairs of first and second pulleys for every second one of said joint members of each said arm section in such a manner that all of said one pulleys rotate in the same direction;

a second wire wound around another pulley of both of said pairs of first and second pulleys for said every second one of said joint members of each said arm section in such a manner that all of said another pulleys rotate in a direction opposite to that of said one pulleys of said every second one of said joint members;

a third wire wound around one pulley of both of said pairs of first and second pulleys for ones of said joint members alternate to said every second ones of said joint members of each said arm section in such a manner that all of said one pulleys rotate in the same direction;

a fourth wire wound around another pulley of both of said pairs of first and second pulleys for said ones of said joint members alternate to said second ones of said joint members of each said arm section in such a manner that all of said another pulleys of said alternate joint members rotate in a direction opposite to that of said one pulleys of said alternate joint members;

a first drive motor for said first and second wires of each said arm section, said first and second wires being wound on said first drive motor such that rotation of said first drive motor winds said first and second wires in opposite directions;

a second drive motor for said third and fourth wires of each said arm section, said third and fourth wires being wound on said second drive motor such that rotation of said second drive motor winds said third and fourth wires in opposite directions; and

flexible tubes extending within said frame bodies and joint members, said first through fourth wires of all of said arm sections extending within said flexible tubes, except those portions of said wires wound around said pulleys, whereby said arm can fold in three dimensions.

4,685,350

PUSH-PULL CABLE MOUNTING ASSEMBLY

Karl-Heinz Bauer, and Heinz Fick, both of Bad Neustadt/Saale, Fed. Rep. of Germany, assignors to Preh Elektrofeinmechanische Werke Jakob Preh Nacht. GmbH & Co., Bad Neustadt/Saale, Fed. Rep. of Germany

Filed Nov. 15, 1985, Ser. No. 798,418

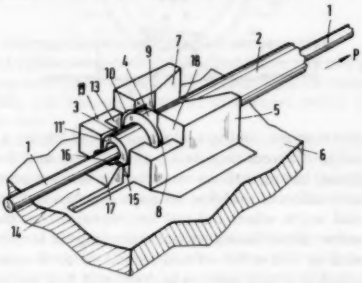
Claims priority, application Fed. Rep. of Germany, Nov. 15, 1984, 3441716

Int. Cl.[4] **F16C** *1/10*

U.S. Cl. 74—501 R **10 Claims**

1. A device for locking an end of a tubular casing having an outer diameter and bearing a shoulder having a greater outer diameter and movably guiding a contained flexible pulling or pressing member characterized in comprising: a holding block having a recess (8) open axially on one side (18) of the holding block (5), a bottom (9) of the recess for receiving a side (12) of a shoulder (4) which is turned away from a front side (11′) of an end (3) of the casing (2) and an edge surface (10) for surrounding the shoulder (4), a radially open slot (7) extending through the holding block (5) and through the bottom (9) and the edge surface (10) of the recess (8) and at least as broad as an outer diameter of the casing (2), for receiving the casing (2) and less broad than an outer diameter of the shoulder (4) at least in the zone of the edge surface (10) and a bottom (9) for retaining the shoulder (4) in the recess (8); and a flexible tongue means (14) positioned in front of the holding block (5) facing said one side (18) of the block and (5) aligned with the slot (7), for stopping a transverse surface of the casing (2).

9. A device for the locking an end of a tubular casing having a substantially uniform outer diameter and a shoulder of greater outer diameter near said end comprising:



a holding block including a recess extending thereinto from one side thereof for receiving a casing shoulder, said recess including an edge surface for surrounding a casing shoulder inserted into said recess and a bottom for interferring engagement with a casing shoulder inserted into said recess, and the block further including an open slot extending axially completely through said block from said one side (18) and radially into said block and into said recess through said edge surface and said bottom for receiving a casing in said block, said slot being sufficiently broad to accept said substantially uniform outer diameter of the casing and less broad than said greater outer diameter of the shoulder at least along parts of said edge surface and said bottom; and

a stopping member positioned adjoining the one side of the holding block facing the open recess and aligned with the slot for interferring engagement with a transverse surface of the casing in the vicinity of said end of the casing.

4,685,351

CYCLE PEDAL SHOE

Ronlee H. Pegg, 3953 S. Valley View Dr., #205 Eagan, Minn. 55122

Continuation of Ser. No. 562,996, Dec. 16, 1983, abandoned, which is a continuation of Ser. No. 338,858, Jan. 12, 1982, abandoned, which is a continuation of Ser. No. 135,265, Mar. 31, 1980, abandoned. This application Jun. 11, 1985, Ser. No. 743,864

Int. Cl.[4] **G05G** *1/14*

U.S. Cl. 74—594.4 **5 Claims**

1. A combination for connecting a foot of a rider to a foot-driven cycle or the like, the combination comprising:

a cycle crank shaft;

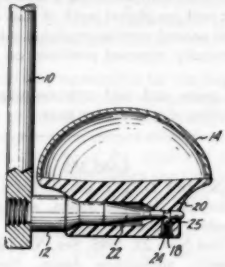
a pedal shaft forming a part of the cycle and having an inner end fixedly attached to an outer end portion of the crank shaft, the pedal shaft extending outwardly along a longitudinal axis generally perpendicular to the crank shaft to an outer end, and the pedal shaft having a shoulder adjacent the inner end, a first shaft portion of a circular cross sec-

tion and a first diameter positioned between the shoulder and the outer end, and a second shaft portion of a circular cross section and a second diameter which is no greater than the first diameter positioned adjacent the outer end of the pedal shaft;

a shoe adapted to be worn on the rider's foot; and

cleat means mounted below and fixedly attached to a sole of the shoe for providing a quick-connect/disconnect force transmitting connection between the shoe and the pedal shaft; wherein the cleat means defines a longitudinal extending opening of circular cross section for receiving the pedal shaft and permitting the pedal shaft to rotate freely within the opening with respect to the cleat means and the shoe about the longitudinal axis as the crank shaft is rotated when the pedal shaft and the cleat means are in the connected position; wherein the longitudinal extending opening has an entrance positioned below the inner side of the shoe; the cleat means comprising:

first pedal shaft engaging means fixedly attached to and positioned below the sole proximate the inner side of the shoe between the toe and the heel end for guiding the second shaft portion of the pedal shaft into the longitudinal opening as the shoe is moved in the first axial direction toward the crank shaft to move the cleat means toward the connected position and for rotatably engaging the first shaft portion of the pedal shaft when the pedal shaft and the cleat means are in the connected position to transmit



force in the transverse direction from the foot through the shoe and the cleat means to the first shaft portion, the first pedal engaging means having a first portion of the longitudinal opening therein which has a circular cross section of a diameter approximately equal to the first diameter;

second pedal shaft engaging means fixedly attached to and positioned below the sole proximate the outer side of the shoe between the toe end and the heel end for rotatably engaging the second shaft portion of the pedal shaft when the pedal shaft and the cleat means are in the connected position to transmit force in the transverse direction from the foot through the shoe and the cleat means to the second shaft portion, the second pedal engaging means having a second portion of the longitudinal opening therein which is axially aligned with the first portion and has a circular cross section of a diameter approximately equal to the second diameter; and

means adjacent the entrance of the longitudinal opening for engaging the shoulder of the pedal shaft when the shoe reaches an end of its movement in the first axial direction inwardly toward the crank shaft to define the connected position; and

beam means projecting downwardly from a bottom surface of the sole and extending substantially the length of said sole and of sufficient thickness to limit deflection of the sole, the beam means including a first rigid beam section fixedly attached to the sole and the cleat means and extending from a heel end of the shoe to the cleat means.

4,685,352

POWER DISTRIBUTING MECHANISM

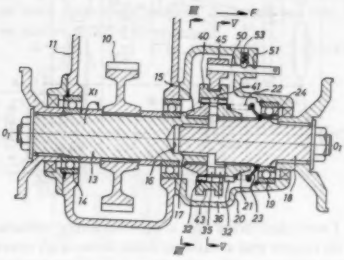
Masahiro Ohkubo, Kadoma, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Negagawa, Japan

Filed Feb. 13, 1985, Ser. No. 701,195

Claims priority, application Japan, Feb. 14, 1984, 59-26767

Int. Cl.[4] F16H *37/06*

U.S. Cl. 74—665 GA **6 Claims**



1. A power distributing mechanism for a vehicle of a front and rear wheel driving type wherein a driving system is designed to transmit power through a transmission to front and rear wheels wherein the front wheels are designed to be steered, comprising:

a shaft for the rear wheels adapted to connect to a driving mechanism;

a shaft for the front wheels coaxially adjacent to the shaft for the rear wheels;

a driving rotator having outer teeth and connected to the outer periphery of the shaft for the rear wheels;

a driven rotator having outer teeth and connected to the shaft for the front wheels;

a forcing means for elastically forcing the driven rotator toward the driving rotator;

a cylindrical intermediate member disposed around both rotators and having inner teeth engageable with the outer teeth of the respective rotators with circumferential spaces therebetween,

said circumferential spaces enable a predeterminable scope of rotation between said front and rear rotators;

braking means for applying a braking force to the intermediate member;

said rotators both being provided at the end surface portions facing each other with correspondingly tapered projections for mutual engagement, the tapering on said correspondingly tapered projections in mutual engagement being operative to induce a parting force on each other responsive to a differing rotary speed of said driving and driven rotators; and

means responsive to said parting force for causing said driven rotator to move axially away from said driving rotator and said intermediate member, while keeping said engagement between said intermediate member and said driving rotator unchanged, whereby said driven rotator is automatically caused to become disengaged from said driving rotator through said intermediate member when said driving rotator and said driven rotator are rotating at differing speed.

4,685,353

TRANSMISSION AND STEERING SYSTEM FOR CROSS-COUNTRY VEHICLE

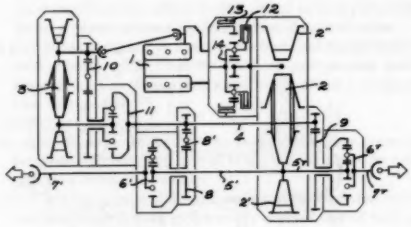
Theodorus P. M. Cadée, Goirle; Siebren C. Van der Veen, Veldhoven, and Marten Fluks, Vianen, all of Netherlands, assignors to Octrooibureau Zuid, Netherlands

Filed Jul. 19, 1985, Ser. No. 756,826

Claims priority, application Netherlands, Jul. 23, 1984, 8402325

Int. Cl.[4] F16H *37/00, 37/06*

U.S. Cl. 74—689 **8 Claims**



1. Two-sided drive for a cross-country vehicle provided with an engine and a variable main drive with reversal device coupled to two similar planetary gear units having sun gears and ring gears wherein:

a. the planet carriers of said planetary gear units are coupled to the out-going shafts of the propulsion mechanism;

b. said ring gears are coupled via an intermediate shaft and a gear transmission, which causes a rotational movement of said ring gears in opposite directions but with the same velocities, said intermediate shaft being rotatable clockwise or counterclock-wise by a variable steering device which is driven by the engine;

c. said sun gears have a common shaft which is coupled to the main drive;

d. said common shaft of said sun gears carries a pulley of a continuously variable drive belt transmission;

e. a second pulley of said continuously variable drive belt transmission is connected to the engine via a clutch or a brake and contains a reversal device; and

f. a second variable drive belt transmission for steering is provided, said second variable drive belt transmission being coupled at one side with the engine and at the other side with said intermediate shaft via a differential.

4,685,354

TRANSMISSION WITH A SPEED REDUCER AND GEAR SHIFTER

Jack L. McCabria, Lima, Ohio, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 746,892, Jun. 20, 1985, abandoned. This application Oct. 3, 1986, Ser. No. 915,944

Int. Cl.[4] F16H *57/10, 3/44*

U.S. Cl. 74—785 **1 Claim**

1. A transmission for an electrically powered vehicle comprising:

an output shaft having a central axis;

a carrier gear having a plurality of peripheral teeth and being mounted to rotate about said central axis;

an over-running clutch connected in a driving relationship between said output shaft and said carrier gear;

a plurality of planet gear shafts extending from circumferentially displaced positions on said carrier gear;

a plurality of planet gears wherein one of said planet gears is mounted to rotate about each of said planet gear shafts;

a sun gear connected to said output shaft and engaged with each of said planet gears;

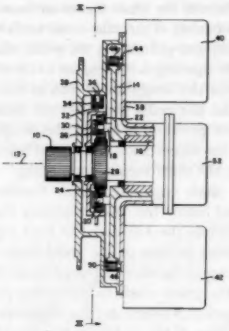
a ring gear mounted to rotate about said central axis and engaged with each of said planet gears;

a transmission housing;

a flange extending radially outward from said ring gear;

a brake for applying frictional forces to said flange, said brake being mounted in a fixed position with respect to said housing;

a first electric motor attached to said housing and having a motor shaft including a first pinion positioned to engage said peripheral teeth of said carrier gear;



a second electric motor attached to said housing and having a second motor shaft including a second pinion positioned to engage said peripheral teeth of said carrier gear;

said first and second pinions engaging said peripheral teeth at diametrically opposed positions on said carrier gear; and

said planet gears and said over-running clutch lying on opposite sides of said carrier gear.

4,685,355

ACCESSORY DRIVE DEVICE IN ENGINE

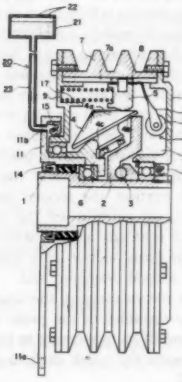
Kazutoshi Kaneyuki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 29, 1985, Ser. No. 802,748

Claims priority, application Japan, Nov. 30, 1984, 59-182909[U]

Int. Cl.[4] F16H *15/50*

U.S. Cl. 74—796 **5 Claims**



1. A device which drives accessories such as an alternator, a cooling water pump, an air-conditioning compressor or the like, utilizing power taken from an output shaft of an engine, said device comprising:

an input shaft rotatably supported on a stationary plate and

receiving output from said output shaft and rotated at a rotational speed corresponding to that of said output shaft;

a transmission output member rotatably supported on said input shaft for transmitting the power to said accessories;

a planetary cone which can rotate on said input shaft in revolution around the axis of the input shaft and in self-rotation about an axis inclined with respect to said axis of the input shaft, said planetary cone having a first part of nearly conical shape, and a second part of nearly cylindrical shape leading to a bottom surface of the first part, and first, second and third frictional transmission surfaces being formed on the conical surface of the first part, the bottom periphery of the first part and the circumferential surface of the second part, respectively;

an input transmission member installed rotatable with said input shaft and engaged at its outer periphery in frictional engagement with the second frictional transmission surface of said planetary cone;

a support shaft of nearly cylindrical shape having a center hole through which said input shaft passes and arranged in coaxial relation to said input shaft and supporting rotatably with respect to said stationary plate said transmission output member;

an orbit ring fixedly supported to said support shaft, said orbit ring extending along the revolution path of said planetary cone and having an annular frictional engaging surface engaged in frictional engagement with the third frictional transmission surface of said planetary cone;

a shifting ring supported on said transmission output member and movable only in the axial direction thereof and having a frictional engaging surface engaged in frictional engagement with the first frictional transmission surface of said planetary cone always within the movable region in the axial direction;

a transmission ratio varying member for varying the position of said shifting ring in a direction toward or away from the rotation center of said planetary cone using the rotational speed of said transmission output member as a parameter and suppressing the rise of the rotational speed of said transmission output member when the rotational speed of said transmission output member because larger than a prescribed value;

said transmission output member having two end plate members positioned on both ends thereof, said end plate members together with said input shaft constituting an enclosed annular infusion chamber filled with an amount of frictional transmission oil; and

a pressure adjusting device for adjusting the pressure of the frictional transmission oil in said infusion chamber, said pressure adjusting device including a second chamber and having bleed holes for connecting said pressure adjusting device to the atmosphere, said second chamber being connected in communication with said infusion chamber, the level of the top of said second chamber being higher than that of the top of said infusion chamber so that the level of the oil in said second chamber is held higher than the top end of said infusion chamber.

4,685,356

CONTROL SYSTEM AND METHOD FOR AN AUTOMATIC TRANSMISSION PROVIDING SMOOTH ENGAGEMENT ACTION

Kunihiro Iwatsuki, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

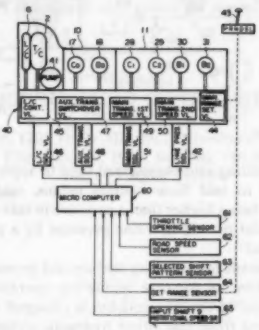
Filed Nov. 14, 1985, Ser. No. 797,867
Claims priority, application Japan, Apr. 18, 1985, 60-083390
Int. Cl.[4] B60K *41/04*
U.S. Cl. 74—866 **8 Claims**

1. In an automatic transmission system for a vehicle, said automatic transmission system comprising a gear transmission mechanism which comprises a rotational element, and first and second friction engaging means which are oppositely changed over between engaged and disengaged states so as to alternately provide one of a first speed stage and a second speed stage of said gear transmission mechanism, a control system comprising:

first means for detecting a rotational speed of said rotational element;

second means for controlling an engagement and disengagement of said first friction engaging means so as to increase a degree of engagement of said first friction engaging means when activated in one of first and second actuating directions thereof and to decrease the degree of engagement of said first friction engaging means when activated in the other of said first and second actuating directions;

third means for repetitively comparing each current value of the rotational speed of said rotational element detected by said first means with a preceding value of the rotational speed of said rotational element detected by said first means in said repetitive comparison;



fourth means for activating said second means to incrementally activate said second means in one of said first and second actuating directions each time said third means detects in said repetitive comparison that the rotational speed of said rotational element is changing in a consistent direction and to incrementally activate said second means in the other of said first and second actuating directions each time said third means detects in said repetitive comparison a change in the direction of change of said rotational speed of said rotational element from said consistent direction until the rotational speed of said rotational element reaches a predetermined value, and to rapidly activate said second means in said consistent direction when the rotational speed of said rotational element reaches said predetermined value.

4,685,357

CONTINUOUSLY VARIABLE TRANSMISSION HYDRAULIC CONTROL SYSTEM HAVING TWO PRESSURE REGULATING VALVES

Daisaku Sawada, Gotenba; Masami Sugaya; Yoshinobu Soga, both of Susono, and Ryuji Imai, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Nov. 26, 1985, Ser. No. 801,831
Claims priority, application Japan, Nov. 30, 1984, 59-254319
Int. Cl.[4] B60K *41/16*
U.S. Cl. 74—867 **4 Claims**

1. A hydraulic control system for a continuously variable transmission having first and second variable-diameter pulleys provided on a first and a second shafts, a transmission belt connecting the first and second pulleys to transmit power from one of the first and second pulleys to the other, and a pair of hydraulic cylinders for changing an effective diameter of the pulleys engaging the belt, said hydraulic control system comprising:

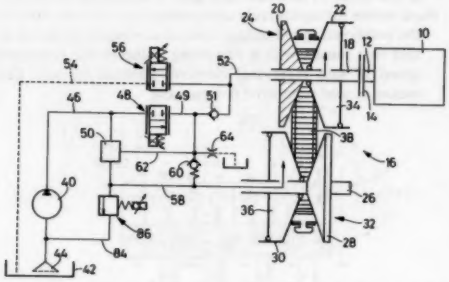
a hydraulic source delivering a pressurized fluid;

a first pressure regulating device for regulating the pressur-

ized fluid to apply a first line pressure to one of said hydraulic cylinders for controlling a tension of the transmission belt;

flow control means for controlling flow of the fluid into the other hydraulic cylinder and flow of the fluid from said other hydraulic cylinder, thereby changing the effective diameters of the pulleys to vary a speed ratio of the transmission;

a second pressure regulating device provided between said hydraulic source and said first pressure regulating device,



and regulating said pressurized fluid to apply a second line pressure to said flow control means, said second line pressure being higher than a pressure in said other hydraulic cylinder or said first line pressure by a predetermined value; and

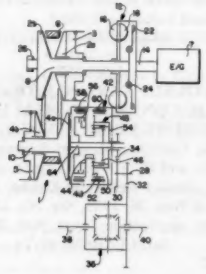
releasing means for releasing said second pressure regulating device from its pressure regulating operation while said speed ratio of the transmission is changed with the fluid discharged from said other hydraulic cylinder, or while said speed ratio is held constant.

4,685,358

HYDRAULIC CONTROL APPARATUS FOR HYDRAULICALLY-OPERATED POWER TRANSMITTING SYSTEM HAVING CONTINUOUSLY VARIABLE TRANSMISSION

Hiroshi Itoh, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jul. 30, 1985, Ser. No. 760,612
Claims priority, application Japan, Aug. 3, 1984, 59-162959
Int. Cl.[4] B60K *41/16*
U.S. Cl. 74—868 **4 Claims**



1. A hydraulic control apparatus for controlling a hydraulically-operated power transmitting system for an automotive vehicle, the power transmitting system including a continuously variable transmission and an auxiliary transmission coupled to the continuously variable transmission, the auxiliary transmission having a first and second forward-drive position corresponding to a high and a low speed range, respectively, which high and low speed ranges are selected by an operator controlled shift lever, said hydraulic control apparatus comprising:

a shift valve controlled by an electric control signal so as to be placed selectively in one of a high-range position and a low-range position to place said auxiliary transmission in said first and second forward-drive positions, respectively,

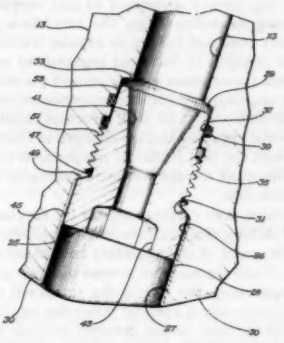
said shift valve comprising lock means for holding said shift valve in said high-range position, irrespective of said electric control signal, while said high speed range is selected by the shift lever.

4,685,359

METHOD OF HARDFACING STEEL BODIED BITS

Steven J. Worthen, Houston, and James D. Oursler, Pearland, both of Tex., assignors to Hughes Tool Company-USA, Houston, Tex.

Filed Aug. 4, 1986, Ser. No. 893,112
Int. Cl.[4] B21K *5/02*
U.S. Cl. 76—108 A **5 Claims**



1. A method of manufacturing a steel bodied bit of the type having cutter elements which disintegrate earthen formations, the method comprising the steps of:

machining a steel body to form a bit having a bit face of a desired profile and an axial passage;

drilling nozzle openings in the bit face which communicate by fluid passages with the axial passage of the bit body;

drilling shallow indicator regions of a predetermined diameter on the bit face, the diameter being slightly larger than that required to receive the cutter elements;

applying a hardfacing to the bit face and within the nozzle openings by brazing thereon a highly conformable metal cloth containing hard, wear resistant particles, the hardfacing being omitted from the indicator regions;

heat treating the bit body;

drilling cutter element holes through the indicator regions, the holes being sized to receive and retain the cutter elements;

afixing the cutter elements within the cutter element holes and installing nozzles within the nozzle openings.

4,685,360

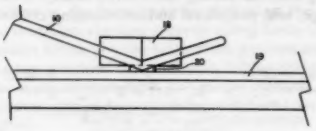
DRAWING HOLDER NUT WRENCH

Gaylord W. McCurdy, 14060 W. 25th Pl., Golden, Colo. 80401

Filed Feb. 19, 1985, Ser. No. 703,141
Int. Cl.[4] B25B *13/02*
U.S. Cl. 81—119 **10 Claims**

1. In a drawing holder nut wrench, the improvement comprising a straight flat plate having one or more elongated

openings adapted for engaging drawing holder nuts, said plate having bends in the plate substantially centered between the



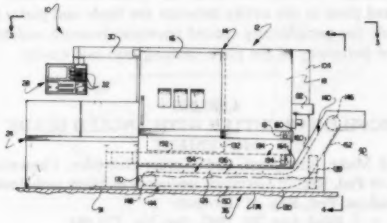
ends of each such openings and perpendicular to the lengths of such openings.

4,685,361

MACHINE TOOL

Carl J. Myers, Mentor, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Oct. 20, 1980, Ser. No. 199,024
Int. Cl.[4] B23B *25/04*
U.S. Cl. 82—2 R **4 Claims**



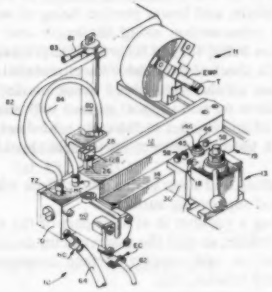
1. A machine tool comprising an elongated base having first and second ends, spindle means connected with said base adjacent to said first end of said base for rotating a workpiece about a spindle axis with a portion of the workpiece disposed in a work area which is accessible to an operator disposed in front of the machine tool, said spindle axis extending perpendicular to vertical planes which at least partially contain the first and second ends of said base, tool support means for supporting a tool to cut material from the portion of the workpiece in the work area as the workpiece is rotated about the spindle axis by said spindle means, means for directing a flow of coolant to the work area, control means disposed at the front of the machine tool and actuatable by an operator to at least partially control operation of the machine tool, a housing which at least partially encloses the work area and the second end of said base, said housing having a plurality of corner portions, said housing including means for at least partially defining an elongated front opening disposed beneath the work area and extending from a location adjacent to said spindle means to the second end of said base, said elongated front opening having a longitudinal upper edge portion which extends to the second end of said base and is generally parallel to the spindle axis, said housing further including means for at least partially defining an end opening at the second end of said base, said end opening being disposed in a plane extending transversely to a plane containing said front opening, said front and end openings intersecting beneath one of the corner portions of said housing, said one corner portion of said housing being free of downwardly extending supports, and chip conveyor means for conveying pieces of material cut from the workpiece past the second end of said base and through the end opening to a discharge area located outside of said housing, said chip conveyor means including an elongated coolant tank for receiving coolant from the work area and a conveyor assembly at least partially disposed in said coolant tank and having an elongated upper run extending generally parallel to the longitudinal upper edge portion of said front opening, said coolant tank having a longitudinally extending upper edge portion which extends generally parallel to and has substantially the same length as the longitudinal upper edge portion of said front opening, said conveyor assembly having an outlet end portion connected with said upper run for conducting material cut from a workpiece away from the end opening to the discharge area, said chip conveyor means being movable through the front and end openings along a straight path extending transversely to the spindle axis between a closed position and an open position, said upper run of said conveyor assembly and said coolant tank being at least partially disposed within said housing beneath the work area and said outlet end portion of said conveyor assembly and said coolant tank projecting outwardly through the end opening past said second end of said base when said chip conveyor means is in the closed position, said upper run of said conveyor assembly and said coolant tank being at least partially disposed in front of the machine tool when said chip conveyor means is in the open position.

4,685,362

QUICK-MOUNT THREAD CUTTING ATTACHMENT FOR LATHES

Julius Mayer, 1208 Holly Hill Dr., Petersburg, Va. 23803

Filed Jun. 19, 1985, Ser. No. 746,585
Int. Cl.[4] B23B *29/18*
U.S. Cl. 82—5 **3 Claims**



1. A quick-mount, semi-automatic thread cutting attachment for lathes comprising:

a main body;

means with said body for mounting same upon the tool holding structure of a lathe;

means for supporting a cutter tool movably with respect to said main body;

actuator means for effecting such movement of the cutting tool supporting means within said body;

means for energizing said actuator means when appropriate;

said actuator means comprising a fluid cylinder having a piston therewithin and a piston rod extending therefrom, mechanical structure directly connecting the extending end of said piston rod with a wedge cam and cam follower structure for actuating said tool holder supporting means;

said actuator means being under the control of a fluid valve;

control means for operating said fluid valve;

said control means comprising an electric solenoid connected to said fluid valve for actuating same;

means for increasing the speed of tool retraction at the end of a cutting stroke;

said means for increasing the speed of tool retraction at the end of a cutting stroke comprising a pair of T-body spring support elements, pins connecting them to the tool holder supporting means, and a compression spring mounted therebetween.

4,685,363

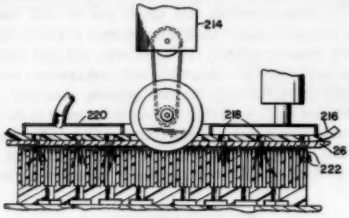
APPARATUS AND METHOD FOR SUPPORTING AND WORKING ON SHEET MATERIAL

Heinz J. Gerber, West Hartford, Conn., assignor to Gerber Scientific, Inc., Windsor, Conn.

Continuation of Ser. No. 736,839, May 22, 1985, abandoned. This application Nov. 6, 1986, Ser. No. 928,637

Int. Cl.[4] B26D *7/08, 7/20*

U.S. Cl. 83—22 **16 Claims**



1. A method of cutting sheet material, which method comprises the steps of:

providing a bed formed by bristles having pointed upper ends the points of which are generally located in a common horizontal plane and form a support surface, said bristles each having a length (L) and having an upper end portion of a length equal to or less than one-forth of said length (L) of the bristle and a lower portion of a length equal to or more than three-fourths of said length (L) of the bristle, said lower portion being of substantially constant cross-section along its length and said upper end portion being shaped to provide a pointed upper end,

placing a sheet of penetrable sheet material on said support surface so that said sheet becomes disposed in spread condition on said support surface with said pointed upper ends of said bristles penetrating said sheet at least to some extent to inhibit movement of said sheet laterally of said bed,

then cutting said sheet with a cutter blade while it is disposed on said supporting surface,

providing a vacuum in at least part of the space containing said bristles so that the said vacuum draws sheet material spread on said support surface downwardly onto said pointed bristles, and

maintaining a said vacuum while said sheet is cut,

said step of maintaining said vacuum while said sheet is cut being carried out in such a manner that said vacuum is maintained in only a selected portion of said space containing said bristles which selected portion includes and surrounds the point at which the cutting takes place.

4,685,364

ROTARY SLICER FOR COMESTIBLE PRODUCTS

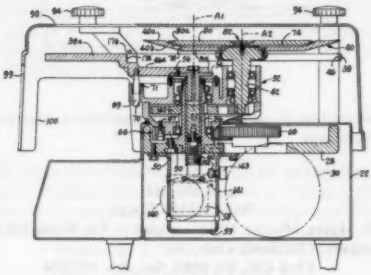
Oliver W. Scheflow, Avon Lake; William J. Roblin, III, Olmsted Township, Cuyahoga County, both of Ohio; Richard C. Kirsch, Norcross, Ga., and William G. Wunder, Hamilton, Mich., assignors to Bettcher Industries, Inc., Birmingham, Ohio

Filed May 17, 1985, Ser. No. 735,435

Int. Cl.[4] B26D *1/16, 7/12*

U.S. Cl. 83—68 **24 Claims**

1. In a slicer for comestible products having a base, a support on the base rotatable relative to the base about a first axis, a circular blade carried by the support and rotatable relative to the support about a second axis parallel to the first, a table rotatable with the support, said table and blade being adjustable axially relative to one another, means to rotate the support relative to the base, means to rotate the blade relative to the support, a circular center plate within the perimeter of the blade and movable with the blade about the first axis and the plate freely rotatable about the second axis relative to both the blade and the support, the improvement wherein the blade is a disk with a peripheral cutting edge and dished contour that provides a cavity between the center plate and blade and wherein the plate has a peripheral contour and the blade has a surrounding contour mating therewith radially inward of the cutting edge, said peripheral and surrounding contours being



slightly spaced from each other and shaped to form a labyrinthine passage between the blade and plate from outside the blade and plate to the cavity between the blade and plate, and the blade has peripherally spaced apertures beneath and adjacent the periphery of the plate opening into said cavity.

4,685,365

PROFILE-BAR CUTTER WITH ANGLED BLADE MOVEMENT

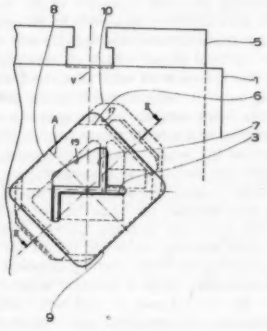
Richard Muhr, Attendorn, and Werner Schröder, Finnentrop, both of Fed. Rep. of Germany, assignors to Muhr und Bender, Attendorn, Fed. Rep. of Germany

Filed Aug. 29, 1985, Ser. No. 770,684

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1984, 3432546

Int. Cl.[4] B23D *23/00*

U.S. Cl. 83—198 **6 Claims**



1. An angle shear for cutting profile steel, the angle shear comprising:

generally parallel, vertical, and spaced front and rear frame plates fixed relative to each other and formed with respective horizontally aligned workpiece windows, the front plate being formed with a pair of parallel rearwardly open grooves flanking the front window and extending at an acute angle of generally 45° to the vertical, the rear window being wider measured perpendicular to the grooves than the front window;

at least one fixed blade carried on the front plate at the front window between the grooves;

a working slide displaceable vertically between the frame plates generally at the windows;

guide rails having front edges seated in the rearwardly open grooves and rear edges projecting rearwardly past the rear plate, the guide rails forming force-transmitting shoulders at the front plate as well as at the rear plate, those shoulders abutting corresponding force-transmitting shoulders formed by the sides of the grooves and the sides of the rear window, the guide rails further extending at the acute angle of generally 45° to the vertical and being secured to at least one of the frame plates at the respective window;

an angle slide displaceable along the guide rails generally at 45° to the vertical between the plates and carrying a movable blade displaceable past the fixed blade; and

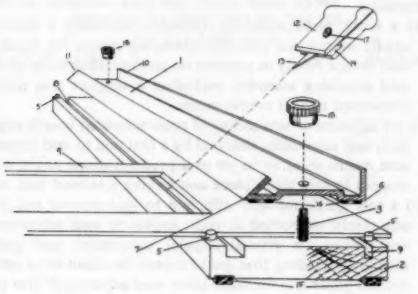
formations linking the slides for joint synchronous movement between the plates in generally the same vertical plane.

4,685,366

HOLDFAST CUTTING SYSTEM

Samuel L. Beder, R.R. 5, Box 84, Cape Elizabeth, Me. 04107

Filed Aug. 7, 1985, Ser. No. 763,299
Int. Cl.[4] B26D *3/02, 7/02*
U.S. Cl. 83—455 **3 Claims**



1. Apparatus for cutting and scoring sheets of material, comprising:

(a) a planar base for supporting said sheets of material where said base is a rectangle and incorporates a plurality of parallel longitudinal channels;

(b) a clamping means for holding said material to said base where said clamping means comprises a generally planar rectangular aluminum plate of a width defined by the inner edges of said longitudinal channels in said planar base and of a length defined by the length of said planar base, possessing upward-turning rims, parallel to said longitudinal channels, oriented at 90° and 45° , respectively, with respect to the plane defined by said plate, and where said clamping means is secured by said plate, and where said clamping means is secured to said planar base by tightening knurled nuts onto vertical machine screws which support springs coaxial with said screws, said screws passing through holes at the centers of opposite ends of both said clamping means and said planar base, thereby fastening said clamping means to said planar base;

(c) a cutting and scoring means that comprises a razor-sharp blade of adjustable exposed length fixed firmly in a slotted cutter carriage, which said slotted cutter carriage fits slideably over said upward-turning rims of said clamping means, said upward-turning rims in combination with said cutter carriage making possible the slideable mounting and guiding of said cutting and scoring means so that said blade can pass through said sheets of material into said longitudinal channels without cutting into said planar base and so that said cutting and scoring means can be guided in a straight line along the surface of said sheets;

(d) lubricating means to enable said slotted cutter carriage to slide smoothly along said clamping means, said lubricating means comprising thin sheets of low coefficient of friction synthetic coating where said low coefficient of friction synthetic coating is affixed to the inner slotted surface of said slotted cutter carriage such that said synthetic coating is in direct contact with said upward-turning rims;

(e) adherent means to prevent movement of said apparatus while said sheets of material are being processed with said apparatus, said adherent means comprising two longitudinal strips attached to underside of said planar base substantially directly under said longitudinal channels, said longitudinal strips having foam rubber-like adherence and resilience;

(f) cushioning means to provide a firm but soft interface between said sheets of material and said clamping means, said cushioning means comprising non-marring pads affixed to the underside of said clamping means thereby ensuring that when said clamping means is tightened against said planar base with said sheets of material between said clamping means and said planar base the top of said sheet of material is prevented from directly contacting said clamping means;

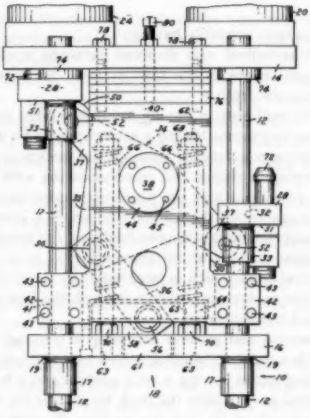
(g) alignment means to define the position of said sheets of material during processing, said alignment means comprising four pegs securely mounted on the top of said planar base, with each of said four pegs located substantially at one of the four corners of said planar base, said pegs defining lines normal and parallel, respectively, to said longitudinal channels in said planar base.

4,685,367

TWO CYCLE AIR CUT-OFF PRESS

Edward G. Lash, Huntington Woods; Roger Levy, Oak Park, and Everett Gleason, South Lyon, all of Mich., assignors to Tishken Products Co., Detroit, Mich.

Continuation-in-part of Ser. No. 647,042, Sep. 4, 1984, Pat. No. 4,579,031. This application Feb. 5, 1986, Ser. No. 826,457
Int. Cl.[4] B26D *5/12, 5/18*
U.S. Cl. 83—626 **14 Claims**



1. A power means for use in a two cycle air cut-off press, said press having a stationary bed plate, spaced upright guide posts mounted upon the bed plate, a top plate received over the opposite ends of said guide posts and an apertured ram plate guidably received and reciprocally mounted upon said guide posts defining with the bed plate a die set area;

said power means comprising:

first and second cylinder means mounted on said top plate including depending first and second piston rods;

first and second opposed guide blocks reciprocally mounted

upon said guide posts and connected to said first and second piston rods respectively, said guide blocks freely reciprocating between upper and lower positions along said guide posts in response to reciprocal movement of said piston rods;

a crank assembly having first and second arms extending outwardly at an angle from a fulcrum, said assembly being pivotally mounted opposite said fulcrum to oscillate about a transverse axis with each of said arms operatively engaging said guide blocks such that reciprocal movement of said guide blocks oscillates said assembly about said transverse axis;

a link means interconnecting said assembly and said ram plate, said link means having one end pivotally connected to said ram plate with said opposite end pivotally connected to said assembly at said fulcrum;

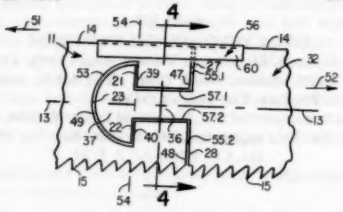
whereby alternate reciprocal movements of said piston rods affect oscillatory movement of said assembly which affects combined oscillatory reciprocal movement of said link and reciprocal movement of said ram plate.

4,685,368

BAND SAW JOINT

Dennis S. Gardner, 955 - 50B Street, Delta, British Columbia, Canada V4M 2V8

Filed Mar. 25, 1985, Ser. No. 715,289
Int. Cl.[4] B23D *61/12*; B27B *33/06*
U.S. Cl. 83—661 **17 Claims**



1. A bandsaw assembly having:

(a) a longitudinal axis disposed between spaced parallel marginal edges of the saw, at least one marginal edge having saw teeth,

(b) a first end portion having a terminal edge and a female connecting means having a neck recess and a head recess, the recesses extending through the thickness of the saw and being so shaped and communicating with each other as to provide at least one main recess edge having a thickness equal to the thickness of the saw and being disposed normally to the saw longitudinal axis, the female connecting means having an extreme outer end provided by said terminal edge which is intersected by the neck recess so that the neck recess extends through the first end portion to said terminal edge,

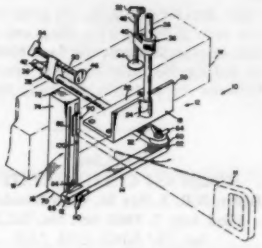
(c) a second end portion including a terminal edge from which a male connecting means extends, said male connecting means having a neck portion and a head portion adapted to fit within the neck recess and the head recess respectively of the first end portion, the neck portion and the head portion being so shaped and connected together to provide at least one main head edge having a thickness equal to the thickness of the saw and being disposed normally to the saw longitudinal axis, the male connecting means having an extreme outer end having the head portion which is disposed at an outer end of the neck portion, engagement of said main recess edge with said main head edge forms a hinge joint permitting hinging of said first and second portions thereabout when the bandsaw assembly is under tension.

4,685,369

PORTABLE MITER DEVICE FOR CHAIN AND HAND SAWS

Ralph R. Beamer, 12825 NE. Marine View Dr., Kingston, Wash. 98346

Continuation-in-part of Ser. No. 765,858, Aug. 14, 1985, abandoned. This application Apr. 15, 1986, Ser. No. 852,335
Int. Cl.[4] B27B *21/08*; B27G *5/02*
U.S. Cl. 83—766 **18 Claims**



1. A portable miter guide device for chain and hand saws, comprising:

(a) a work piece attaching assembly including a holding cradle means and coacting clamping means for holding said device firmly in position on an elongated work piece, said attaching assembly including a support arm means connected to said cradle means,

(b) an adjustment arm means of predetermined length angularly and adjustably attached by a first end to said support arm means so as to be set at a predetermined angle with respect to said work piece and having a second end, and

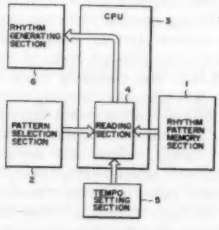
(c) a saw guide member attached to said second end and adjustably supported at right angles to said adjustment arm means for pivotal angular movement, said guide member including first guide means for chain saws and a second guide slot for hand saws, said adjustment arm slot parallel to said first guide slot and saw guide member being adapted together to accurately guide a saw through true and compound cuts.

4,685,370

AUTOMATIC RHYTHM PLAYING APPARATUS HAVING PLURALITY OF RHYTHM PATTERNS FOR A RHYTHM SOUND

Hiroko Okuda, and Hiroshi Iwase, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1986, Ser. No. 828,238
Claims priority, application Japan, Feb. 18, 1985, 60-28380
Int. Cl.[4] G10H *1/42, 7/00*
U.S. Cl. 84—1.03 **9 Claims**



6. An automatic rhythm playing apparatus comprising:

rhythm kind selecting means for selectively designating one particular kind of rhythm from a plurality of kinds of rhythms;

rhythm pattern memory means for storing a plurality of kinds of rhythm playing pattern data corresponding to each of different rhythm sounds which may be used to play a particular kind of rhythm selected by said rhythm kind selecting means;

pattern selection means for selectively designating one of said rhythm playing pattern data from a plurality of kinds of rhythm playing pattern data stored in said rhythm pattern memory means;

rhythm sound generating means for generating a plurality of different rhythm sounds; and

control means for reading out a particular kind of rhythm playing pattern data from a plurality of kinds of rhythm playing pattern data stored in said rhythm pattern memory means according to a selection of said pattern selection means corresponding to each of selected rhythm sounds used to play a particular kind of rhythm selected by said rhythm kind selecting means, and for driving said rhythm sound generation means according to said rhythm playing pattern data for controlling generation of predetermined rhythm sounds.

4,685,371

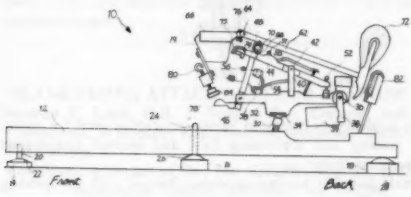
GRAND PIANO ACTION

Gary M. Levinson, Zoar Rd., Rowe, Mass. 01367

Filed Jun. 12, 1985, Ser. No. 744,134

Int. Cl.[4] G10C *3/18*

U.S. Cl. 84—239 **24 Claims**



1. A method of making a reduced friction action for a grand piano of the type which includes a repetition lever, key means for actuating said repetition lever and a knuckle, said method comprising the step of adhering a strip of film of a low friction polymeric material to that surface of said repetition lever which comes into contact with a surface at the knuckle when a key of said grand piano is struck to lower the friction between said surface and said repetition lever, to increase the responsiveness of the action, and to improve the longevity of the action.

4,685,372

VALVE UNIT FOR A BRASS MUSICAL INSTRUMENT

Kenzo Kawasaki, Shizuoka, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Apr. 23, 1986, Ser. No. 856,041

Claims priority, application Japan, Apr. 24, 1986, 60-060194[U]

Int. Cl.[4] G10D *9/04*

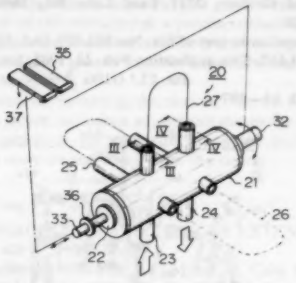
U.S. Cl. 84—392 **5 Claims**

1. A valve unit for a brass musical instrument provided with blow-in and blow-out tubes and N sets of resonant tubes, where N is an integer, comprising:

a cylinder having an axial bore communicating with said blow-in and blow-out tubes and said resonant tubes;

a piston inserted with an airtight fit into said axial bore in said cylinder, and provided with (N - 1) pairs of through holes formed radially therethrough, each pair including two through holes;

first means for driving said piston for rotation over a prescribed angle in order to make said blow-in blow-out tubes communicate with a selected one of (N - 1) sets of resonant tubes; and



second means for driving said piston for axial displacement in order to make said blow-in and blow-out tubes communicate with the remaining one of said resonant tubes.

4,685,373

MUSICAL INSTRUMENT

Juan Novo, 12440 SW. 188 Ter., Miami, Fla. 33177

Filed Apr. 7, 1986, Ser. No. 849,262

Int. Cl.[4] G10D *7/02*

U.S. Cl. 84—464 A **15 Claims**

1. A musical instrument assembly of the wind type such as a flute and primarily designed to be illuminated, said instrument assembly comprising:

(a) an elongated body having a cylindrical wall structure and a hollow interior extending along the length of said body surrounded by the wall structure, said hollow interior extending between a proximal end and a distal end oppositely disposed to one another along the length of said body,

(b) said body comprising a head portion and a foot portion disposed adjacent to said proximal end and said distal end, respectively and a main body portion secured in interconnecting relation between said head and foot portions,

(c) a mouth piece and a blow hole formed in said head portion in substantially adjacent, spaced relation to said proximal end and structured for fluid communication with said hollow interior,

(d) a key assembly movably mounted on an exterior of said body and cooperatively positioned in removable covering relation to an aperture assembly integrally formed in said body, whereby said key assembly is manipulated by fingers of a player to regulate exiting of air from the body through said aperature assembly,

(e) a crown assembly removably secured to said head portion adjacent said proximal end and including an illumination means for directing light into said wall structure of said body at said head portion,

(f) said wall structure of said body including said head portion, main body portion and said foot portion formed of a light transmitting material, whereby said body appears illuminated upon activation of said illumination means.

4,685,374

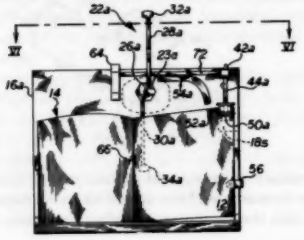
PAGE TURNING APPARATUS AND METHOD

Richard Goldner, 3717 Toad Lake Rd., Bellingham, Wash. 98226

Continuation-in-part of Ser. No. 544,699, Oct. 24, 1983, Pat. No. 4,553,467. This application Feb. 22, 1985, Ser. No. 704,473

Int. Cl.[4] G10G *7/00*

U.S. Cl. 84—487 **8 Claims**



1. An apparatus for individually turning the pages of a book or other compilation of pages comprising:

a. a mounting table for supporting a book on its upper surface;

b. a rotatable shaft perpendicularly mounted through said table for rotation;

c. an elongated arm means mounted on and adapted for rotation with said shaft; said arm means being parallel to and spaced apart from said upper surface a distance sufficient to rotate over said pages;

d. a cam pivotally mounted to said table, said cam being biased away from the table and positioned for intersection with the elongated arm, said cam including biasing means;

e. means for lifting a page mounted to said cam ; and

f. means for rotating said rotatable shaft in one direction only.

4,685,375

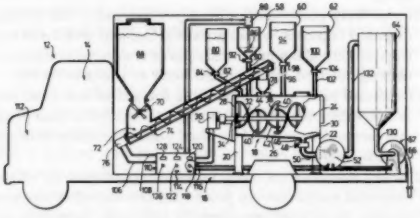
MIX-DELIVERY SYSTEM FOR EXPLOSIVES

Cyrus A. Ross, and Eberhard Thurow, both of Kirkland Lake, Canada, assignors to Les Explosifs Nordex Ltee/Nordex Explosives Ltd., Kirkland Lake, Canada

Continuation of Ser. No. 610,310, May 14, 1984, Pat. No. 4,614,146. This application May 28, 1986, Ser. No. 868,763

Int. Cl.[4] F42B *3/00*

U.S. Cl. 86—20.15 **3 Claims**



1. A method of mixing a batch of aqueous slurry explosive comprising mixing 100 parts by weight of components of said slurry explosive in a variable speed mixer which induces a forward and a reverse flow to said mixture in providing continuous shear blending of the mixture components, said method comprising mixing at a first speed in said mixer 10 to 20 parts by weight of ambient temperature water with 3 to 12 parts by weight of sugar and optionally up to 5 parts by weight of air bubble entraining agent other than paint fine aluminum, continue mixing at said first speed and adding 50 to 85 parts by weight of ground ammonium nitrate and increasing the mixing speed to a second speed in forming a slurry of ammonium nitrate, adding if needed up to 5 parts by weight of paint fine aluminum air bubble entraining agent in a plastic mesh binding to provide a total of said air bubble entraining agent up to approximately 6 parts by weight, adding a dispersion of 1 to 4 parts by weight of guar gums and 2 to 6 parts by weight of ethyleene glycol and continuing mixing at said higher second speed, reducing mixing speed to said first speed when complete distribution of components is achieved and continuing mixing at said first speed until the guar gum component is compeltely hydrated.

4,685,376

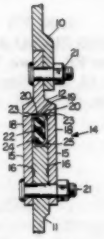
SEPARATION SYSTEM

Vincent R. Noel, Huntington Beach, and Fred B. Van Shoubroueck, Westminster, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Jun. 24, 1985, Ser. No. 748,336

Int. Cl.[4] F42B *1/00, 15/00*

U.S. Cl. 89—1.14 **7 Claims**



7. An explosively operated linear separation joint for structurally joining and separating first and second contiguous sections, comprising:

a female member having opposing flanges with an opening portion therebetween so as to form a clevis shape having two opposite outside flange surfaces and two opposing inside flange surfaces and a bottom surface, the intersection of said inside flange surfaces and said bottom surface forming a fillet at the line of intersection;

shear lip grooves located in said outside flange surfaces generally opposite and in-line with said fillets;

explosive means contained in said opening portion of said female member;

a male member sized to slidably nest within said opening in said female member and against said explosive means; and

means to attach said male member to said female member.

4,685,377

MISSILE LAUNCHER WITH EJECTION SHOE

Guy Mace, Le Chesnay; Andre Anglard, Rambouillet, and Andre Insa, Montigny, all of France, assignors to Matra, France

Filed Feb. 20, 1986, Ser. No. 831,309

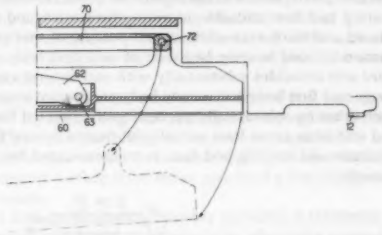
Claims priority, application France, Feb. 22, 1985, 85 02612

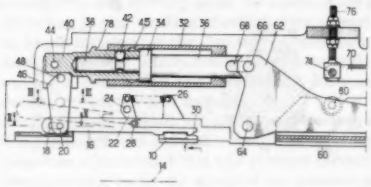
Int. Cl.[4] B64D *1/02;* **F41F** *3/06*

U.S. Cl. 89—1.54 **6 Claims**

1. A missile launcher for use on an aircraft, comprising: a supporting structure arranged for being secured to the framework of an aircraft; connecting means for releasably securing a missile of elongated shape along a predetermined direction on said structure; a bearing shoe shaped to contact said missile over a sufficient length along said direction for maintaining said missile in a predetermined position with respect to said shoe; a plurality of links pivotally connected to said shoe and to said structure by pivotal connections, which pivotal connections are distributed at points so selected that said links, said supporting structure and said bearing shoe behave like a deformable quadrilateral; and fluid pressure actuated means for

successively releasing said connecting means and actuating said links in a direction causing the shoe to push the missile





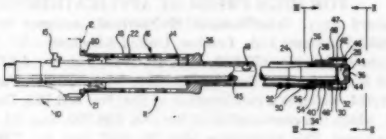
away from said structure upon energization of said pressure actuated means.

4,685,378

BLANK FIRING ATTACHMENT FOR MACHINE GUN

Norman E. Lusk, R.R. 1, Seeleys Bay, Ontario, and Ian J. Anderson, 26 Hickory Hill Crescent, Kitchener, Ontario, both of Canada

Continuation-in-part of Ser. No. 527,389, Aug. 29, 1983. This application Nov. 18, 1985, Ser. No. 798,863
Claims priority, application Canada, Oct. 14, 1982, 413408
Int. Cl.[4] F41F *17/12*
U.S. Cl. 89—14.5 **10 Claims**



1. For use with a machine gun of the type having a casing, a barrel breech with a end adjacent the casing, a muzzle remote from the casing and a bore of known cross sectional area, and an automatic firing mechanism operated by barrel recoil relative to the casing, a blank firing attachment comprising:

a tubular jacket adapted to be positoned over the barrel and having a rearward end adapted to be secured to the casing, the length of the jacket being such that when it is positioned over the brrel and secured to the casing, a forward end of the jacket surrounds the muzzle;

a restrictor having

a tubular wall positionable with a sliding fit over a forward portion of the barrel adjacent the muzzle,

a transverse wall that extends across the muzzle when the tubular wall is positioned over the forward portion of the barrel so as to define a chamber bounded by the muzzle, the tubular wall and the transverse wall,

means defining one or more over pressure relief openings in the transverse wall of the restrictor, in communication with the chamber, the over pressure relief openings having a cross sectional area substantially smaller than the cross sectional area of the barrel bore, and

means for defining one or more exhaust ports through the tubular wall of the restrictor at a predetermined distance from the transverse wall, the exhaust ports having a total cross sectional area greater than the cross sectional area of the barrel bore; and

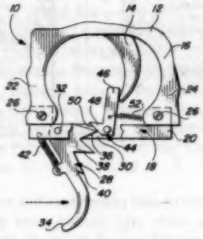
mounting means for mounting the restrictor on the forward end of the jacket, including adjustment means for adjusting the position of the restrictor along the jacket for movement towards and away from the casing.

4,685,379

MULTIPLE FIRING GUN AND TRIGGER EXTENSION ASSEMBLY

Vincent F. Troncoso, 14090-6100 Rd., Montrose, Colo. 81401

Filed Jul. 14, 1986, Ser. No. 885,413
Int. Cl.[4] F41C *19/00*
U.S. Cl. 89—136 **7 Claims**



1. An improved multiple firing gun assembly, said gun assembly comprising, in combination:

A. A semi-automatic gun having a firing trigger and a frame including a trigger guard; and,

B. a multiple firing gun trigger extension assembly, including

i. an elongated horizontal trigger guard bar incorporated into the lower portion of said trigger guard

ii. a gun trigger-actuating component rotatably secured to said trigger guard bar and including

a. a supplemental trigger below said guard, movable between a resting position and a sequential firing position,

b. a plurality of spaced trigger-activating fingers disposed in an arc above said supplemental trigger, and

c. means including a trip lever rotatably secured to said trigger guard bar and extending thereabove for movement between a resting position and a trigger actuating position, said trip lever being in the path of travel of said fingers and rotatable thereby to effect sequential multiple firing movement of said gun trigger.

4,685,380

MULTIPLE STROKE RADIAL PISTON MACHINE

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Division of Ser. No. 344,110, Jan. 29, 1982, abandoned, which is a division of Ser. No. 244,110, Feb. 7, 1980, abandoned. This application Sep. 30, 1982, Ser. No. 429,649
Int. Cl.[4] F01B *13/06*
U.S. Cl. 91—488 **21 Claims**

1. In a radial piston device in combination: a housing, a rotor rotatably mounted in said housing, working chambers in said rotor, pistons reciprocable in said working chambers and along wall faces of said working chambers, inlet channels and outlet channels communicated to said chambers and to said housing, a stroke guide provided in said housing and radially of said chambers and pistons for the guidance of the strokes of said pistons, stroke transfer bodies mounted between said pistons

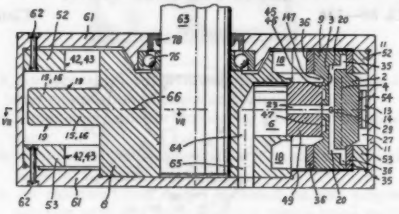
and said stroke guide, control means for the control of flow of fluid to and from said working chambers, and multiple inward and outward inclined guide faces on said stroke guide to guide said reciprocable pistons a plurality of times inward and outward in said chambers along said wall faces at each revolution when said rotor revolves;

wherein fluid pressure pockets are provided in the direction of a lateral load of said pistons,

wherein said fluid pressure pockets are located between peripheral outer portions of said pistons and portions of said wall faces,

wherein said stroke transfer bodies are pivotably borne on bearing beds on said pistons to permit pivotion of said bodies around center axes which are normal to the axes of said pistons and parallel to the axis of said rotor,

wherein said stroke transfer bodies have ends with an ability to move along said outward and inward guide faces of said stroke guide, while said ends have portions with second



axes parallel to said center axes but eccentrically distanced therefrom with said second axes pivotable about said center axes and caused to pivot about said center axes under the play of forces which are exerted onto said ends of said transfer bodies and onto said transfer bodies by the pressure in fluid in said working chambers and by the movements of said ends along said inclined guide faces,

wherein said pivotion runs through angles of pivotion between pivot angle limitations which are formed by said bodies and said pistons,

wherein control portions are provided on said stroke transfer bodies and said pistons to control the flow of fluid through passages into said pockets, and,

wherein said control portions alternately open and close said passages in dependency of said angles of pivotion and thereby in timed relation to the movement of said stroke transfer bodies along said outward and inward guide faces of said stroke guide.

4,685,381

PIVOT PORTION OF A PISTON SHOE IN FLUID MACHINES

Karl Eickmann, 2420 Isshiki, Hayama-machi, Kanagawa-ken, Japan

Continuation-in-part of Ser. No. 575,623, Jan. 31, 1984, abandoned, which is a continuation-in-part of Ser. No. 228,634, Jan. 26, 1981, abandoned, which is a division of Ser. No. 911,246, May 31, 1978, abandoned. This application Sep. 20, 1985, Ser. No. 778,041

Int. Cl.[4] F01B *13/06*

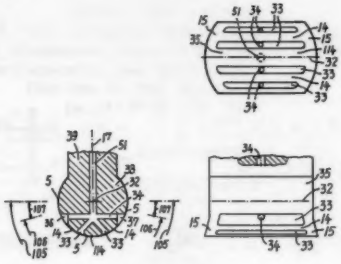
U.S. Cl. 91—488 **10 Claims**

1. An assembly of a first body which comprises a piston and a thereon pivotable second body, wherein the first body has a first axis longitudinal through said first body, a part-cylindrical bearing bed face of substantially the form of about half of a hollow cylinder and formed with a first radius around a second axis which is normal to said first axis and extending through said first axis, a passage extends through said first body and through said bearing bed face while said passage is communicated to a space under high pressure in fluid,

wherein said second body includes a pivot portion having a pivot face complementary formed to said bearing bed face and about 180 degrees with a second radius around a third axis,

wherein said first and second radii are substantially equal and said pivot portion is borne with its pivot face on said bearing bed face and able to pivot thereon around said second and third axes while at said bearing of said pivot portion on said bearing bed face of said first body said third axis coincides substantially with said second axis,

wherein said first body and second body are pressed towards each other by substantially oppositionally directed forces and said faces are at least partially lubricated by said fluid whereto said bearing bed face is communicated by said passage,



wherein a plurality of recesses are provided into portions of one of said faces, said recesses are communicated to said passage and filled with fluid under pressure when said space whereto said passage is communicated contains fluid under pressure, and,

wherein said recesses have a narrow width but a greater length and said recesses extend with their greater lengths in a direction parallel to said second and third axes whereby the remainders of said pivot face between said recesses form bearing lands between said recesses which extend parallel to said recesses and said second and third axes.

4,685,382

CYLINDER-PISTON COMBINATION, PARTICULARLY FOR HIGH-PRESSURE APPLICATION

Bernhard Frey, Schaffhausen, Switzerland, assignor to Hydrowatt Systems Ltd., London, United Kingdom

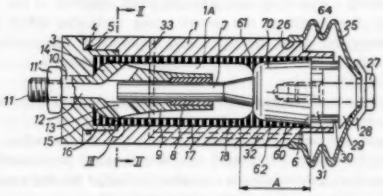
Division of Ser. No. 359,830, Mar. 19, 1982, Pat. No. 4,527,464, which is a division of Ser. No. 127,590, Mar. 6, 1980, Pat. No. 4,329,914, which is a continuation of Ser. No. 860,183, Dec. 13, 1977, which is a continuation of Ser. No. 639,700, Dec. 11, 1975, abandoned. This application May 28, 1985, Ser. No. 738,381

Claims priority, application Switzerland, Dec. 17, 1974, 16800/74; Nov. 27, 1975, 15354/75

The portion of the term of this patent subsequent to Jul. 9, 2002, has been disclaimed.

Int. Cl.[4] F01B *19/04*

U.S. Cl. 92—86.5 **7 Claims**



1. A piston and cylinder combination, particularly for high-pressure fluid application, comprising:

two relatively movable working members one of which defines a piston and the other of which defines a cylinder;

said two relatively movable working members defining therebetween a working chamber with strokes of increasing and decreasing working chamber volume;

a deformable sealing member connected with each of said working members so as to hermetically seal the working chamber;

a support surface provided at one side of said sealing member for supporting such sealing member against the action of pressure prevailing in the working chamber;

at the surface of said deformable sealing member facing said support surface there being provided a low-friction component;

said deformable sealing member including a transition zone which comprises a chemically or physically bonded juction to the working member which working menber, during operation, moves relative to said support surface;

said transition zone exerting under the action of the pressure prevailing in said working chamber, over at least part of its length measured in the direction of movement of said working member which moves relative to said support surface, a pressure on said low-friction component and thereby on said support surface;

said transition zone and its junction to said working member being arranged such and said transition zone having elastic properties selected such that said pressure exerted by said transition zone under the action of the pressure preveailing in said working chamber on said low-friction component and on said support surface decreases in a direction from said working chamber to a low-pressure region during operation of the piston and cylinder combination; and

said transition zone comprises at least two partial elements of different resistance against deformation.

4,685,383

SEAL FOR RODLESS CYLINDER WITH SHUTTLE PISTON

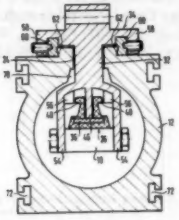
Erich Ruchser, Kernen, Fed. Rep. of Germany, assignor to Herion-Werke KG, Fellbach, Fed. Rep. of Germany

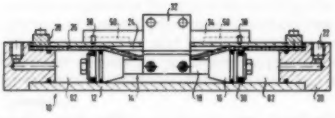
Filed Aug. 13, 1985, Ser. No. 765,268

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1984, 3429783

Int. Cl.[4] F01B *29/00*

U.S. Cl. 92—88 **20 Claims**





1. A cylinder device;

comprising:

a cylinder defining an axis and having a cylinder wall provided with a longitudinal slot extending in axial direction thereof;

a piston reciprocating in axial direction within said cylinder;

a power transmission element having one end portion connected to said piston and projecting with its said cylinder wall; and

a flexible sealing element for sealing said piston against said cylinder wall and being provided along its surface facing away from said piston with longitudinal beads which are detachably arranged with respect to said slot to allow traversing of said power transmission element at a radially inward distance to said cylinder wall, said sealing element being provided with a sealing lip of trapezoid cross section whose side walls taper outwardly wherein said longitudinal beads extend outwardly over the edges of said slot as defined by said cylinder wall to retain said sealing element in position when extending in said slot.

4,685,384

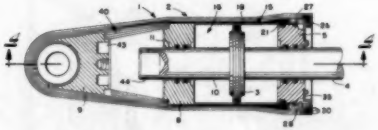
FLUID ACTUATOR INCLUDING COMPOSITE CYLINDER ASSEMBLY

William Dirkin, Portage; Duane Douglass, Vicksburg; James N. Tootle, and Terry L. Benton, both of Portage, all of Mich., assignors to Pneumo Corporation, Boston, Mass.

Continuation of Ser. No. 642,540, Aug. 20, 1984, abandoned. This application Feb. 28, 1986, Ser. No. 834,501

Int. Cl.[4] F16S *10/02*

U.S. Cl. 92—166 **33 Claims**



1. In a fluid actuator, a cylinder including a chamber for receiving a piston-rod assembly, said chamber having end wall members at opposite ends thereof and a liner member defining the inner wall of said chamber, said liner member having one end in overlapping engagement with one of said end wall members, said one end wall member having a ring portion extending radially outwardly beyond said one end in said liner member, circumferential hoop stress windings extending circumferentially around said liner member over the entire length thereof, said hoop stress windings extending substantially the full radial extent of said ring portion outwardly of said one end of said liner member, and longitudinal tension windings extending over said circumferential hoop stress windings.

4,685,385

REFINISHING UNIT

Colin W. Rich, P.O. Box 98, Great North Road, Welwyn, Hertfordshire, England

Filed Dec. 20, 1984, Ser. No. 684,287

Int. Cl.[4] B05B *15/12*

U.S. Cl. 98—115.2 **1 Claim**

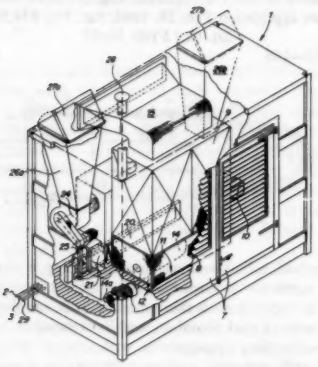
1. A refinishing unit for automobiles, comprising:

a portable, free standing weather proof spray booth and a portable, self-contained air handling module connectable to said booth for providing heated, filtered air to said booth and for exhausting the contaminated exhaust air contained within said booth;

said booth comprising a roof unit for supplying air received from said air handling module to the interior of said booth comprising an input chamber in communication with the interior of said booth, a hot air inlet means for connecting said input chamber with the exterior of said booth and

replaceable first dry filter means in said input chamber for filtering the air passing through said input chamber into the interior of said booth and for equally dispersing the air flow from said inlet chamber into and about the interior of said booth; a floor unit having a floor including an air permeable section for allowing the exhaust air to pass therethrough and for supporting an automobile, an under floor chamber means positioned below and in communication with said air permeable section, exhaust air outlet means for connecting said under floor chamber with the exterior of said booth, and secondary replaceable dry filtering means in said under floor chamber for filtering the exhaust air flowing through said air permeable section to said exhaust air outlet means; four support columns for supporting said roof unit above said floor unit; wall means having panels and door means for gaining access to said booth, extending from said floor unit to said roof unit and between said columns for enclosing said booth;

said air handling module comprising an enclosed housing, a door providing access to said housing and having a fresh air inlet with replaceable third dry filter means for filtering the fresh air entering said fresh air inlet, a heat generator positioned within said housing, a heat exchanger connected to said heat generator and heated by said heat exchanger, first fan means connected to said fresh air inlet



and to said heat exchanger for supplying fresh air to said heat exchanger for heating the air, heated air outlet means connected to said heat exchanger and to the exterior of said housing, exhaust air intake means connected to the exterior of said housing and replaceable fourth filter means for filtering the air passing through said exhaust air intake means, second exhaust air outlet means connected to the exterior of said housing, second fan means connected between said exhaust intake means and said second exhaust outlet means;

said air handling module heated air outlet means and said exhaust air intake means being respectively connected with said hot air inlet means and said exhaust air outlet means of said booth such that a continuous flow of fresh, filtered and heated air is supplied to the interior of said booth from said air handling module and is expelled as exhaust air from said booth to said air handling module and to the atmosphere through said second exhaust air outlet means by said first and said second fan means respectively; and

said air permeable section of said floor unit being positioned with respect to an automobile that is in position for refinishing such that the stream lines of the flow of exhausting air are drawn in around the bottom of the automobile for reducing the turbulence of the exhaust air flow around the body of the automobile.

4,685,386

AUTOMATIC APPARATUS FOR THE CONTINUOUS COOKING OF INDIVIDUAL FOOD PORTIONS BY BOILING OR FRYING

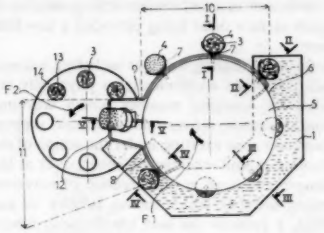
Jacques Bezon, Campagne Chantavert, 83880 Meounes, France

Filed Mar. 6, 1985, Ser. No. 709,346

Claims priority, application France, Mar. 13, 1984, 84 03974; Feb. 14, 1985, 85 02388

Int. Cl.[4] A47J *37/12*

U.S. Cl. 99—404 **8 Claims**



1. Apparatus for the automatic and continuous cooking of food portions, said apparatus comprising: baskets with bottoms for containing said food portions; a horizontal basket-carrying wheel from which said baskets are suspended; a vessel containing liquid to cook said food portions; a heating means for heating said liquid; an upper guiding ramp; and a lower guiding ramp; said upper guiding ramp having sloped ends so that when said wheel is rotated said baskets are guided down one sloped end into and through said liquid and are guided up said other sloped end to ascend from said liquid, said apparatus further comprising a second horizontal wheel at a lower level than said first horizontal wheel, said second horizontal wheel carrying plates, and means such that when said upper guide ramp guides said baskets over said plates the bottoms of said baskets open to allow said food portions to empty onto said plates, said bottoms being securely closed, at all places except over said plates, by said lower guide ramp.

4,685,387

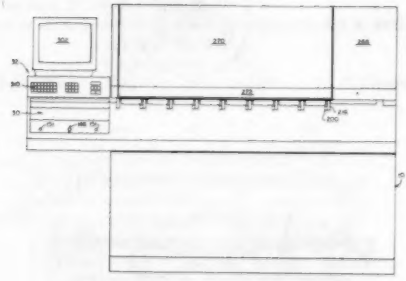
MACHINE FOR MAKING SANDWICHES

Robert K. Hanson, Framingham; Herbert H. Loeffler, Arlington, and Philip J. Mattera, Beverly, all of Mass., assignors to Hanson Technology Corp., Northborough, Mass.

Filed Aug. 20, 1985, Ser. No. 767,517

Int. Cl.[4] A21C *9/04*; B23B *31/04*

U.S. Cl. 99—450.4 **28 Claims**



1. A machine for making sandwiches comprising a sandwich facing and a sandwich filler, the machine comprising:

a frame including a horizontal base member having a plurality of apertures arranged in a straight row;

a plurality of first cannister means each adapted to store a solid sandwich filler such as meat or cheese, each of said cannister means being removably positioned above and in alignment with said apertures whereby a sandwich filler may be dispensed from said cannister means via said apertures;

a carriage positioned beneath said base member, said carriage including support means for carrying a sandwich facing;

guide means supporting said carriage for reciprocal movement parallel to said base member along a path that extends lengthwise of said row of apertures;

drive means for moving said carriage along said path so as to successively position said support means below successive ones of said apertures;

dispensing means for removing sandwich filler from selected ones of said cannister means and depositing the same on said sandwich facing as said carriage advances along said path, said dispensing means including a selectively operable door mounted for slidable movement adjacent a bottom end of said each first cannister means, said dispensing means further comprising a plurality of selectively operable door operating means each associated with a corresponding respective one of said doors for moving said doors between a first open position wherein said bottom ends of said first cannister means are open for removal of a selected sandwich filler and a second closed position wherein said bottom ends are blocked and said solid sandwich filler in said first cannister means is supported by said doors; and

control means for controlling movement of said carriage and operation of said dispensing means.

4,685,388

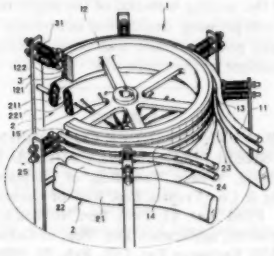
DEVICE TO REMOVE PEANUTS FROM THE ROOT THEREOF

Chang C. Chen, Hsin-Chu, Taiwan, assignor to Industrial Technology Research Institute, Chu Hsien, Taiwan

Filed Feb. 18, 1986, Ser. No. 829,994

Int. Cl.[4] A23N *15/00*

U.S. Cl. 99—641 **18 Claims**



1. A device for removing pod peanuts from a root thereof, comprising:

a stem and leaf conveying mechanism including a driving member and a sliding member resiliently mounted around said driving member so as to define a horizontal stem and leaf conveying passage therebetween, said sliding member comprising means for resiliently holding the stem and leaf portion of a peanut plant against said driving member such that movement of said driving member along said stem and leaf conveying passage conveys the stem and leaf portion of peanut plant along said stem and leaf conveying passage;

a pod peanut rubbing and conveying mechanism under said stem and leaf conveying mechanism, said pod peanut rubbing and conveying mechanism including a rotary rubbing member and a fixed rubbing member mounted around said rotary rubbing member so as to define a horizontal pod peanut twisting and conveying passage therebetween in parallel to said stem and leaf conveying passage, for twisting and conveying pod peanuts on the roots of the peanut plant while the stem and leaf portion of the peanut plant is being conveyed along said stem and leaf conveying passage in rubbing engagement with said rotary rubbing member and said fixed rubbing member; and

means for driving said driving member and said rotary rubbing member so as to twist the pod peanut portion relative to the stem and leaf portion with said rotary rubbing member so as to twist the pod peanuts from the roots thereof while concurrently conveying said stem and leaf portion and said peanut pod portion along said stem and leaf conveying passage and said pod peanut twisting and conveying passage, respectively.

4,685,389

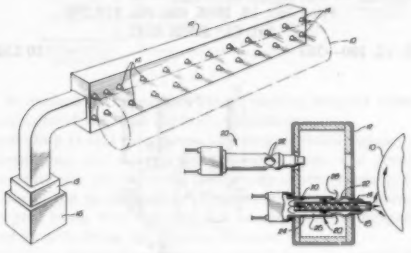
HOT AIR CALENDER ROLL CONTROLLER

Mathew G. Boissevain, Cupertino, Calif., assignor to Measurex Corporation, Cupertino, Calif.

Continuation-in-part of Ser. No. 694,855, Jan. 25, 1985. This application Jan. 28, 1985, Ser. No. 695,438

Int. Cl.[4] B30B *15/34, 15/04*

U.S. Cl. 100—93 RP **7 Claims**



1. In a calender roll control apparatus of a type having a plurality of nozzles for directing flows of air toward a calender roll to control the diameter of the calender roll and thereby control the thickness of a sheet of calendered material, the improvement comprising:

a plurality of individually controllable heating elements, each heating element being associated with one of the nozzles for selectively heating the flow of air through the associated nozzle, wherein the nozzles are positioned at fixed intervals in a row lengthwise along the calender roll and additional nozzles are positioned near the ends of the calender roll, each of the additional nozzles having associated therewith an additional controllable heating element for selectively heating the flow of air through the additional nozzles.

4,685,390

CALENDER WITH EXCHANGEABLE ROLLS

Josef Pav; Reinhard Wenzel, both of Krefeld; Peter Svenka, Grefrath, and Richard Rauf, Krefeld, all of Fed. Rep. of Germany, assignors to Kleinewefers GmbH, Krefeld, Fed. Rep. of Germany

Filed Apr. 23, 1985, Ser. No. 726,131

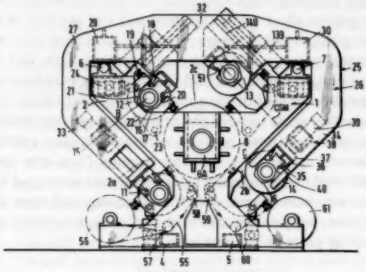
Claims priority, application Fed. Rep. of Germany, May 2, 1984, 3416212

Int. Cl.[4] B30B *3/04*

U.S. Cl. 100—168 **42 Claims**

41. The calender of claim **40**, further comprising means for

comparing the signals from said sensor means with predetermined refererce signals and for operating said switching means



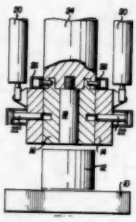
in response to predetermined deviation of signals which are generated by said sensor means from said reference signals.

4,685,391

REMOTELY CONTROLLED MULTISHAPED CONTAINER COMPACTING PRESS

Franck Picker, Nashville, Tenn., assignor to The Scientific Ecology Group, Inc., Oak Ridge, Tenn.

Filed Jan. 16, 1986, Ser. No. 819,270
Int. Cl.[4] B30B *9/32*
U.S. Cl. 100—242 **10 Claims**



1. A press for compacting waste materials in different sized and/or shaped containers including a larger container and a smaller container without disassembly of said compacting press, said press comprising:

a press bed;

mold means, having an inner cavity, for providing a compaction fit around said larger container;

sleeve means, receivable in said mold means inner cavity and having a said sleeve means inner cavity, for providing a compaction fit around said smaller container;

ram means, receivable in said sleeve means inner cavity, for compacting said larger and smaller containers;

mold locking means for interconnecting of said sleeve means with said mold means;

ram locking means for interconnecting of said sleeve means with said ram means;

ram power means for moving said ram means between a load position and a crushed position; and

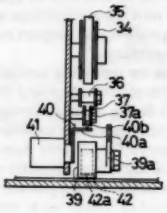
mold power means for moving said mold means between a load position and a closed position, said closed position comprising said mold means in contact with said press bed, said ram means comprising a means for crushing said smaller container under the influence of said ram power means when said sleeve means is in said closed position, said ram means and said sleeve means together comprising a means for crushing said larger container under the influence of said ram power means when said ram locking means has interconnected said sleeve means with said ram means.

4,685,392

AUTOMATIC DEVICE FOR PREPARING PAPER ROLLS FOR WEB PASTING

Takemi Watanabe, Toyonaka, Japan, assignor to Kabushiki Kaisha Kaneda Kikai Seisakusho, Osaka, Japan

Filed Jun. 24, 1986, Ser. No. 877,929
Int. Cl.[4] B41F *13/56*; **B65H** *19/22*
U.S. Cl. 101—226 **7 Claims**



1. A device in a printing system for preparing paper rolls held on a reel stand for web pasting which comprises:

a paper roll stand for holding a paper roll in such a manner as to hold it rotatable in two opposite directions;

a table board for supporting thereon the leading web end of a paper roll;

an arm assembly positioned above said table board, whose arm proper is movable to move its foremost end in lateral directions as well as in lengthwise directions;

a vacuum suction cup device held by said arm assembly for lifting up the outermost web of the paper roll;

a cutter device held by said arm assembly for cutting the web of the paper roll;

an adhesive tape-attaching device held by said arm assembly for adhesively attaching adhesive tapes for web pasting to the leading web end of the paper roll;

a web edge-fastening strip-attaching device for adhesively attaching one end portion of a fastening strip to the inner side of the leading web end of the paper roll; and,

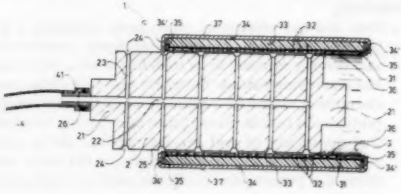
a paper roll-pressing device for adhesively attaching the other end portion of said web edge fastening strip to the outer surface of the paper roll.

4,685,393

ROTOGRAVURE CYLINDER COMPRISING A CORE AND A SHELL DETACHABLY JOINED THERETO

Karl Saueressig, Vreden, Fed. Rep. of Germany, assignor to Saueressig & Co., Vreden, Fed. Rep. of Germany

Filed Mar. 12, 1986, Ser. No. 838,679
Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511530; European Pat. Off., Feb. 20, 1986, 86102237.4
Int. Cl.[4] B41F *13/10*
U.S. Cl. 101—375 **18 Claims**



1. A rotogravure cylinder comprising:

a substantially solid core formed of a metal with an outer

surface and having passages for passing compressed air to said outer surface;

a sleeve detachably joined to the core and adapted to be fitted onto and removed from said core, said sleeve being formed of at least three concentric layers, an inner layer of a material of low elasticity, and being slightly compressible, a center layer of a rigid and inherently stable material, and an outer layer comprised of copper.

4,685,394

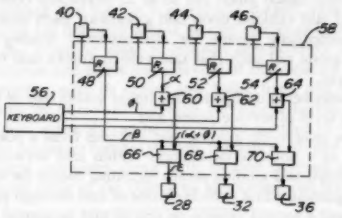
PHASE REGISTER CONTROL FOR PRINTER-SLOTTER MACHINE

Robert H. Craemer, Cherry Hill, N.J., assignor to Molins Machine Company, Cherry Hill, N.J.

Filed Feb. 20, 1986, Ser. No. 831,211

Int. Cl.[4] B41F *13/24*

U.S. Cl. 101—426 **6 Claims**



1. Method of maintaining phase register among the shafts of the sections of a printer-slotter machine including a reference shaft, comprising:

coupling said shafts mechanically so that said shafts are rotatable in unison,

sensing angular position of said reference shaft and generating a first signal representative thereof,

sensing angular position of another machine section shaft and generating a second signal representative thereof,

generating a third signal representative of desired angular position of said machine section shaft with respect to the angular position of said reference shaft,

combining said first, second and third signals and generating an error signal based thereon, and

separately rotating said machine section shaft in response to said error signal to bring said machine section shaft into the desired angular position with respect to the position of said reference shaft.

4,685,395

CONTROLLED INDUCTIVE COUPLING DEVICE

Alan G. King, Dundonald, Scotland, assignor to Imperial Chemical Industries PLC, London, England

Filed Mar. 4, 1985, Ser. No. 708,054

Claims priority, application United Kingdom, Apr. 25, 1984, 8410518

Int. Cl.[4] F42C *15/40*; F42B *3/18*; F42D *5/00*

U.S. Cl. 102—202.2 **12 Claims**

1. An assembly for firing an electric ignition element comprising:

a transformer having a magnetically permeable core, a primary circuit adapted to be connected to a source of A.C. energy and a secondary circuit;

an ignition element connected to said secondary circuit; and

means for selectively applying a steady magnetic field within at least a portion of said core, the intensity of said steady magnetic field within said core being sufficiently strong to prevent effective transmission of electrical energy from said primary circuit to said secondary circuit the passage of electrical energy from said primary circuit to said secondary circuit being enabled when said applying means does not apply said steady magnetic field.

4,685,396

METHOD AND APPARATUS FOR SAFER REMOTELY CONTROLLED FIRING OF IGNITION ELEMENTS

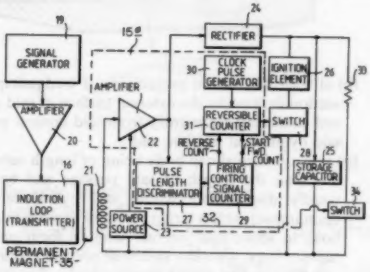
Alan D. Birse, Glasgow, and Alan G. King, Ayrshire, both of Scotland, assignors to Imperial Chemical Industries PLC, London, England

Filed Aug. 21, 1985, Ser. No. 767,918

Claims priority, application United Kingdom, Sep. 4, 1984, 8422323

Int. Cl.[4] F42C *11/06*

U.S. Cl. 102—206 **37 Claims**



1. A method for firing an electric ignition element from a remote control site, said method comprising:

generating at said remote site an energy control signal;

transmitting said energy control signal from said remote control site and receiving said energy control signal at the site of the ignition element, the received energy control signal being of sufficiently low energy as to be incapable of directly firing the ignition element;

amplifying the received energy control signal in amplifying means powered from a local power source located adjacent to the ignition element to provide an amplified local energy signal;

feeding the amplified energy signal to local energy storage means whereby said energy storage means is charged with sufficient energy for firing said ignition element;

thereafter generating at said remote site at least one characteristic firing control signal;

transmitting said firing control signal(s) to firing control means located at the site of the ignition element whereby at least one characteristic firing control signal is identified and,

in response to said identification, discharging said energy storage means through said ignition element.

4,685,397

LEAD-FREE BULLET FOR HUNTING

Hans-Ludwig Schirneker, Engelslit 10, D-4773 Möhnesee-Völlinghausen, Fed. Rep. of Germany

Filed Mar. 12, 1986, Ser. No. 839,117

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510343

Int. Cl.[4] F42B *11/10*

U.S. Cl. 102—510 **6 Claims**

1. An improved two-piece, mushrooming petal bullet for use in hunting, consisting of

(1)

(a) a solid shot body made of tombac, or copper having a forwardmost nose portion and a horizontal axis;

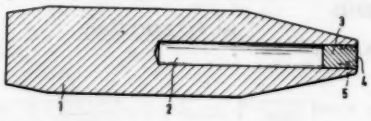
(b) said nose portion including a cylindrical internal wall forming a blind passage extending rearwardly within

said body along said axis and including an internal wall, said passage having a uniform diameter and being substantially cylindrical over its entire length free of prefabricated notches or grooves; and

(2)

(a) a solid body cap having a generally cylindrical shape for substantially its entire length; said cap body having an outer diameter substantially equal to the diameter of said cylindrical passage; said cap body being force fitted into and closing the open end of said passage;

(b) a conical portion formed in the forwardmost portion of said cap body and flaring outwardly from said cap body;



(c) at least two lateral projections of wedgeshaped cross section defined by the external surface of said cap body and extending rearwardly from said conical portion to said cylindrical portion; and

(d) said cylindrical cap body being of length substantially less than the length of said passage and being rearwardly displaceable within said cylindrical passage upon impact with a target, thereby causing said projections to score said internal wall to form preferential rupture lines, whereby said nose portion ruptures along said lines and to spread laterally to form petals.

4,685,398

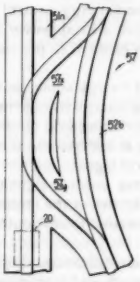
COMPREHENSIVE UNIT TRANSPORTATION SYSTEM

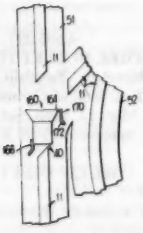
Waldemar F. Kissel, Jr., 4321 N.W. 66th Ter., Gainesville, Fla. 32066

Filed Aug. 14, 1984, Ser. No. 629,123

Int. Cl.[4] B61B *13/04*

U.S. Cl. 104—88 **3 Claims**





1. A transportation system comprising;

a network of guideways comprising through guideways crossing one another at different levels to define a plurality of intersections, each of said through guideways comprising a T-shaped raised guide rail anchored to a roadbed surface, said guideways being segregated into level-of-surface zones according to a predetermined, substantially constant, traffic speed;

said network of guideways further comprising at least one tangential loop transfer guideway interconnecting said through guideways at each of said intersections each of said tangential loop transfer guideways including a T-shaped raised guide rail secured upon one of a plurality of roadbed surfaces and having at least one point of tangency with one of said through guideways, said point of tangency being characterized by a merge rail segment, a loop rail segment unconnected to said through guideway, and an exit rail segment;

a plurality of self-propelled vehicles adapted for unidirectional travel about said network of through guideways and tangential loop transfer guideways, said vehicles each including a downwardly extending guide rail shoe enveloping said raised guide rail so as to physically constrain each of said vehicles upon said guideway, each shoe further comprising means for electronically sensing said raised guide rail such that said vehicle tracks said raised guide rail,

said vehicles being designated for travel within one or more of said level-of-service zones; and

means for selectively guiding said vehicles from a point of origin to a point of destination within said network of guideways, said guiding means including means for selectively guiding a first vehicle on one of said through guideways and a second vehicle on one of said tangential loop transfer guideways such that upon said first vehicle and said second vehicle reaching said point of tangency at the same time, said first vehicle moves at constant speed along said through guideway and said second vehicle is directed around said tangential loop transfer guideway via said loop rail segment at constant speed.

4,685,399

INTERMODAL TRANSPORT

Dorian R. W. Baker, Oriel Villa, 64 Bloomfield Avenue, Bath BA2, 3AA, United Kingdom

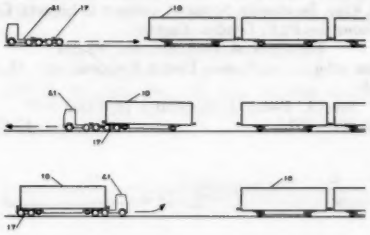
PCT No. PCT/GB84/00326, § 371 Date May 29, 1985, § 102(e) Date May 29, 1985, PCT Pub. No. WO85/01481, PCT Pub. Date Apr. 11, 1985

PCT Filed Sep. 25, 1984, Ser. No. 740,060

Claims priority, application United Kingdom, Sep. 30, 1983, 8326276

Int. Cl.[4] B61D *3/12*; B61F *3/12*

U.S. Cl. 105—4.1 **12 Claims**



1. A convertible rail and highway vehicle for use on railroad rails and alternately for use on highways with tractors including at least one fifth wheel mechanism for engaging a cargo container, said vehicle comprising:

(a) an elongated cargo container having a bottom planar exterior surface terminating in a first and second opposing ends and having a parallel upper planar surface forming the cargo bed of the container;

(b) a pair of standard railwheel trucks spaced apart and

operably connected to a portion of the bottom container surface adjacent the first and second opposing ends;

(c) a major intermediate section of the bottom surface between the railwheel trucks being stepped downwardly therefrom such that the underside of each opposing end is at an appreciably higher level than the major intermediate section and the portion of the bottom surface supporting the railwheel trucks;

(d) a first and second coupling means (fifth wheel coupling pin) centrally anchored to the first and second ends, respectively;

(e) a bogie carriage means comprising two pairs of wheel assemblies rotatably connected to an elongated frame and provided with a third means for coupling with one of the first or second means for coupling and being pinned to one side of said cargo container;

(f) said third means being a fifth wheel coupling plate supported on an upper portion of the frame of the bogie carriage and having a receptacle therein adapted to receive the coupling means on one container end; and

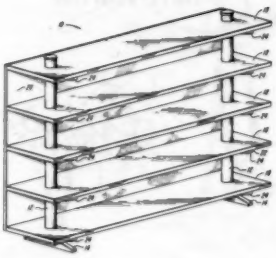
(g) the coupling plate is inclined downwardly toward its external end and is made devoid of any capacity for lateral shifting, with its center line being fixed and coincident with the chassis of the bogie carriage, whereby the bogie wheel assembly can be moved and coupled to one end of the container bottom surface, thereby to lift one end of the cargo container along with its first railroad truck then being clear of the otherwise supporting rail trackage.

4,685,400

BREAK-DOWN SHELVING ASSEMBLY

Hans E. Unander-Scharin, P.O. Box 917, Wolfeboro, N.H. 03894

Filed Mar. 19, 1986, Ser. No. 841,163
Int. Cl.[4] A47B *47/00*
U.S. Cl. 108—111 **9 Claims**



1. Shelving structure comprising:

a plurality of hollow, upright support members;

at least one shelf extending horizontally in a first direction;

a plurality of T-shaped brackets each having a cross member and a central, downwardly projecting locking portion;

wherein said shelves have openings into which the support members are inserted in a close fitting relationship;

wherein said support members have horizontally aligned openings with dimensions equal to at least the width and maximum height of said brackets located at spaced intervals along said support members;

said brackets and openings being configured, located and dimensioned so that said brackets are inserted with a lateral movement into said horizontally aligned openings with said downwardly projecting locking portion positioned within said support piece following said lateral insertion; thereafter, the bracket is moved downwardly so that the locking portion fixedly engages the support member and

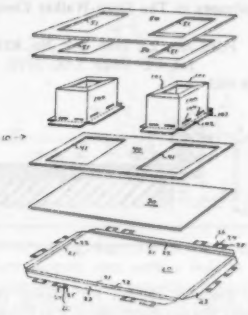
said shelves resting on said brackets.

4,685,401

COFFEE TABLE

Phil B. Sheffer, New Oxford, Pa., assignor to Merchandising Innovations Co., Inc., Hanover, Pa.

Filed Nov. 25, 1985, Ser. No. 801,411
The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.
Int. Cl.[4] A47B *3/06*
U.S. Cl. 108—153 **1 Claim**



1. A coffee table assembly kit comprising:

a top wrapping layer (**20**),

said top wrapping layer (**20**) having flaps (**23**) formed thereon via score line means (**21, 22**),

said flaps (**23**) having tab elements (**24**) formed as a part thereof,

two pedestal means (**100**) having flap means (**102**) turned outwardly therefrom upon assembly,

said pedestal means (**100**) further having slots (**104**) factory pre-cut in a side wall thereof,

said coffee table assembly kit further including at least one pedestal retaining pad (**50**),

said at least one pedestal retaining pad (**50**) being sized so that its exterior dimensions will lie just inside the score line means (**21, 22**) formed on said top wrapping layer (**20**),

said at least one pedestal retaining pad (**50**) further having two aperture means (**51**) formed therein and sized so as to slide over said pedestal means (**100**) and to retain said pedestal flap means (**102**) in a desired position,

means whereby said pedestal slots (**104**) are positioned to be above said pedestal retaining pad (**50**) when in its assembled position,

means whereby said tab elements (**24**) may be fitted into said pedestal slots (**104**) to hold said pedestal retaining pad (**50**) in its desired position,

said assembly kit further including a solid top pad means (**30**) sized on its exterior dimensions so as to lie just inside the score line means (**21, 22**) formed on said top wrapping layer (**20**),

said assembly kit further including a center positioning pad having two aperture means (**41**) formed therein and sized so as to receive the outer dimensions of pedestal flaps (**102**) so as to locate said pedestals (**100**) in a desired position,

wherein said score line means (**21, 22**) comprises an inner score line (**21**) and an outer score line (**22**) wherein the distance between said score lines is sufficient to accommodate the thicknesses of said solid top pad (**30**), said center positioning pad (**40**) and said at least one pedestal retaining pad (**50**) whereby said pads may be securely retained within said top wrapping layer (**20**) upon construction of the assembly kit,

wherein all of the recited kit components are fabricated of corrugated fiberboard material,

wherein said tab elements (**24**) formed on said top wrapping layer (**20**) have ears (**25**) formed on either side thereof and

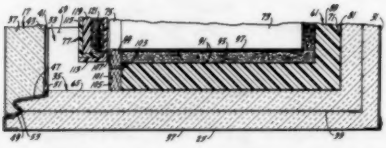
means whereby said ears (25) may be bent into a locking position upon insertion of said tabs (24) into said pedestal slots (104).

4,685,402

FIRE RESISTIVE CABINET FOR STORING EASILY DAMAGEABLE ELECTRONIC DATA STORAGE MATERIALS

Lowell F. Nelson, and Robert A. Laird, both of Muskegon, Mich., assignors to The Shaw-Walker Company, Muskegon, Mich.

Filed Jan. 22, 1986, Ser. No. 821,252
Int. Cl.[4] E04F 5/00, 5/16
U.S. Cl. 109—65 4 Claims



1. A fire resistive cabinet for storing easily damageable electronic data storage materials such as floppy discs to protect them against the deleterious effects of heat and moisture, said cabinet including:

an outer housing of fire resistive construction having top, bottom and side walls and one end wall defining a cavity with an opening into the cavity and a door closing the opening into the cavity,

an inner compartment installed in the cavity of the outer housing and having an inner cavity,

said inner compartment including top, bottom and side walls and one end wall defining said inner cavity with each of said walls abutting a corresponding wall of the outer housing and having an opening which aligns with the opening into the cavity of the outer housing,

an infrared reflective barrier formed as the outer element of the inner compartment,

a layer of polyurethane foam located inwardly of the infrared barrier in each wall,

a layer of endothermic phase transformation material located inwardly of the layer of polyurethane foam in each wall,

the infrared reflective barrier formed as a bag which is shaped and dimensioned to snugly fit into the cavity of the outer fire resistive housing and to contain the inner layer of polyurethane foam and the endothermic phase transformation material, and

an insulated removable cover closing the opening into the inner cavity of the inner compartment.

4,685,403

AUXILIARY INCINERATOR APPARATUS

James P. Crawford, P.O. Box 13243, Orlando, Fla. 32859

Filed Dec. 8, 1986, Ser. No. 939,088
Int. Cl.[4] F23G 1/00
U.S. Cl. 110—194 15 Claims

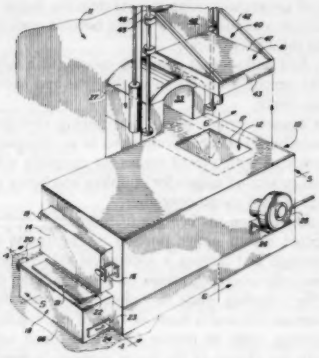
1. An auxiliary incinerator apparatus for an incinerator comprising:

a main incinerator having primary and secondary chambers formed with a plurality of refractory walls, said main incinerator having a main door into the primary chamber, and said main incinerator having an outer framework and walls spaced from the refractory walls, and one refractory wall having an opening therethrough;

a refractory passageway extending from said opening in said main incinerator wall to the outer wall and having an opening through said outer wall;

an auxiliary incinerator attached to one side of the main incinerator adjacent to said opening from said refractory passageway through said outer wall, said auxiliary incinerator having an incineration chamber formed therein with an opening thereinto; and

auxiliary door means for opening and closing over said



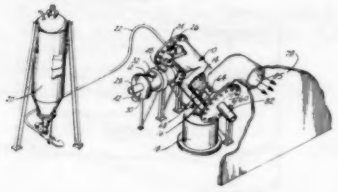
opening from said refractory passageway through said outer wall and for opening and closing over the opening into said auxiliary incinerator, whereby partially incinerated materials can be moved from the main incinerator to the auxiliary incinerator for further combustion.

4,685,404

SLAGGING COMBUSTION SYSTEM

Douglas B. Sheppard, Torrance; Albert Solbes; John C. Stansel, both of Rancho Palos Verdes, and Lance E. Hill, Torrance, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Continuation of Ser. No. 670,417, Nov. 13, 1984, abandoned.
This application Oct. 18, 1985, Ser. No. 788,929
Int. Cl.[4] F23D 1/00
U.S. Cl. 110—265 14 Claims



1. In an apparatus for the combustion of particulate carbonaceous fuel in a combustion zone and separation of the slag content of the fuel from the gaseous product of combustion, the combination of:

(a) a metallic, fuel-cooled combustion chamber having its walls maintained at temperatures such that a layer of slag is maintained on the inside surfaces of the walls;

(b) means for injecting oxidizer into said chamber in a manner to provide high velocity swirling flow of a mixture of oxidizer, fuel particles and combustion products within an annular portion of said combustion zone adjacent said inside surfaces;

(c) means for introducing particulate carbonaceous fuel into said chamber at a relatively low velocity compared to that of the oxidizer and in a manner and direction to maintain a relatively fuel-rich stoichiometry within a longitudinally-extending central portion of said combustion zone;

(d) means regulating the fuel input rate relative to the oxidizer input rate for providing rotational flow velocities, stoichiometric conditions and predetermined combustion temperatures within ranges such that most of the carbon

contained in the fuel is converted to oxides of carbon and most of the non-combustibles present in the fuel are fused and deposited as liquid slag, thereby being separated from the gaseous products of combustion;

(e) an apertured baffle positioned at the exit end of said combustion chamber, said baffle defining a substantially circular orifice and a slot extending downwardly from said orifice with combustion products exiting from said combustion chamber through said orifice in a high velocity whirling stream and molten slag flowing along the bottom wall of the combustion chamber and through said slot;

(f) a slag-recovery chamber coupled to receive products of combustion from said combustion chamber, said slag-recovery chamber being adapted to operate substoichiometrically; and

(g) means for flowing gaseous products from said slag recovery chamber to an associated end-use equipment, said means including means to add supplementary oxidizer to said flowing gaseous products in the region of flow of said gaseous products to said associated end-use equipment.

4,685,405

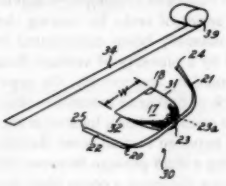
APPARATUS FOR MAKING AN ATHLETIC SUPPORTER

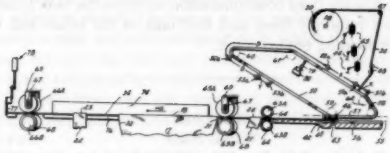
Alvin C. Drury, Cincinnati, Ohio, assignor to Jung Corporation, Cincinnati, Ohio

Division of Ser. No. 835,963, Mar. 4, 1986. This application Sep. 16, 1986, Ser. No. 908,038

Int. Cl.[4] D05B *21/00, 23/00*

U.S. Cl. 112—121.15 **6 Claims**





1. Apparatus for producing an athletic supporter, said supporter comprising a waistband, a pouch and two leg straps, said apparatus comprising

a work table over which a waistband strip may be moved in a machine direction,

a spacer chain oriented to cooperate with said waistband strip as it moves over said work table, said spacer chain being operable to permit a machine operator to locate the free ends of said supporter's leg straps and the top edge of said supporter's pouch on said waistband strip in the desired locations relative one to the other, and relative to the length of said waistband strip, prior to attachment of said leg straps and pouch to said waistband; and

attaching equipment for securing said waistband, pouch and leg straps together in said desired locations.

4,685,406

LOOPER FOR SEWING MACHINES

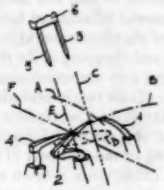
Franco Marchesi, Pavia, Italy, assignor to Rockwell-Rimoldi S.p.A., Italy

Continuation of Ser. No. 537,766, Sep. 30, 1983, abandoned. This application Apr. 29, 1985, Ser. No. 728,370

Claims priority, application Italy, May 6, 1983, 20970 A/83

Int. Cl.[4] D05B *57/02*

U.S. Cl. 112—199 **5 Claims**



1. An improved looper mounting for use in sewing machines having a looper support arm with a hole in the outer end thereof, said improved looper mounting comprising:

(a) angularly orientable positioner receivable into the hole in the looper support arm;

(b) position indexing means on said positioner;

(c) a looper having a shank portion;

(d) indexing means on the shank of said looper and shaped to cooperate with said indexing means on said positioner; and

(e) fastening means extending through said looper support for fastening to said support, respectively, said positioner and above the latter said looper shank, in such a manner that the coupling between the shank and the positioner is effected in a single predetermined position.

4,685,407

METHOD FOR SEWING TOGETHER A TUBULAR WORKPIECE AND A POCKET-SHAPED WORKPIECE AND AUTOMATIC SEWING DEVICE FOR CARRYING OUT THE METHOD

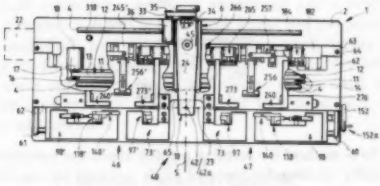
Hubert Jünemann, Bielefeld, Fed. Rep. of Germany, assignor to Kochs Alder AG, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,254

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518473

Int. Cl.[4] D05B *97/00, 21/00*

U.S. Cl. 112—262.2 **3 Claims**



1. Method of sewing together a margin of a tubular workpiece, which has a placket dividing the margin, and a pocket-shaped workpiece which consists of two partially connected plies, and having an opening between said two plies, the placket being bound by lateral edges delimiting ends of the margin, the method comprising the following steps:

the pocket-shaped workpiece is positioned, clamped and the opening is opened;

the margin of the tubular workpiece is straightened thereby widening the placket;

the margin of the tubular workpiece is inserted into the opened opening of the pocket-shaped workpiece;

before or after the margin of the tubular workpiece is inserted into the opening, the tubular workpiece is clamped on the lateral edges of the placket in the area of the ends of the margin while gathering up a material fullness of the margin;

one of the two lateral edges is positioned relative to the pocket-shaped workpiece while partially drawing out said material fullness;

a first part of a straight-lined seam is sewn, said first part starting adjacent to said one lateral edge end ending before said material fullness not being drawn out;

the clamping of the tubular workpiece in the area of said one lateral edge and clamping of the pocket-shaped workpiece in an adjacent area are terminated;

the second one of said two lateral edges is positioned relative to the pocket-shaped workpiece while at least partially drawing out the material fullness not being drawn out before sewing of the first part of the seam;

a second part of the seam is sewn starting at said first part and ending adjacent to said second one of said two lateral edges.

4,685,408

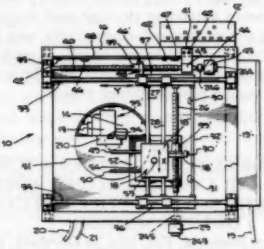
CLOTH STITCHING APPARATUS AND METHOD

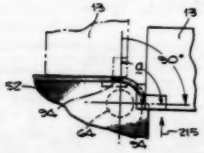
David E. Frye, 25464 Via Adorna, Valencia, Calif. 91355

Division of Ser. No. 685,998, Dec. 24, 1984. This application Apr. 29, 1986, Ser. No. 857,086

Int. Cl.[4] D05B *1/00, 97/00*

U.S. Cl. 112—262.3 **3 Claims**





1. In a method for forming a stitch about the periphery of a generally rectangular piece of cloth material having rounded corners using an overlock sewing machine having means for selectively hemming, stitching and cutting off excess material from a sewn piece of cloth, the method comprising the steps of:

moving said piece of cloth material along a first axis into operative engagement with said sewing machine at a predetermined surface speed;

hemming, stitching and trimming along one elongated side of said piece of cloth material thereby forming a first stitched row until said sewing machine is adjacent one of the rounded corners of said piece of cloth material;

stopping the movement of said piece of cloth material when said piece is adjacent said corner; and

subsequently turning the sewing machine while stitching and at said surface speed thereby stitching a rounded row of stitching at said corner.

4,685,409

DEVICE FOR THE STORING OF OIL

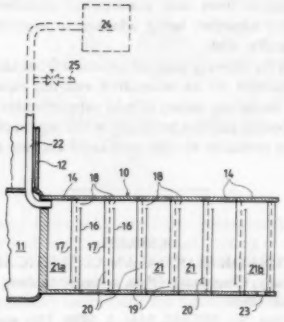
Hadar Lidén, Västra Frölunda, Sweden, assignor to Götaverken Arendal AB, Sweden

Filed May 24, 1985, Ser. No. 737,447

Claims priority, application Sweden, Jun. 1, 1984, 8402977

Int. Cl.[4] B63B *3/02*

U.S. Cl. 114—74 R **3 Claims**



3. A device for storing a fluid in an underwater receptacle, comprising:

a plurality of bulkhead assemblies subdividing said receptacle into a series of tanks for storing the fluid, each said bulkhead assembly being constructed from a steel plate reinforced by a plurality of vertical flanges;

openings formed in, respectively, the upper and lower portion of each of bulkhead assemblies separating two tanks, one of said openings being located in the bulkhead assemblies plate between two adjacent flanges;

means forming a fluid passage between adjacent upper and lower portion openings, a cover plate interconnecting said two flanges to form said passage;

a conduit connected to a first tank in the series of tanks for the supply and withdrawal of the fluid being stored; and

an orifice for fluid communication between the tank located most remotely from said first tank in the series and the surrounding environment.

4,685,410

WING SAIL

Robert R. Fuller, P.O. Box 383, 119 Tea Rock La., Marshfield, Mass. 02050

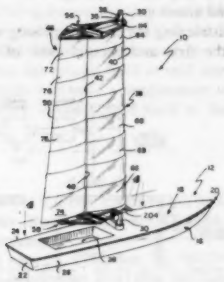
Filed Apr. 8, 1985, Ser. No. 720,958

Int. Cl.[4] B63H *9/06*

U.S. Cl. 114—102 **10 Claims**

1. An airfoil sail system for a boat having a mast, the airfoil sail system comprising a front airfoil pivotable about an axis defined by the mast, the front airfoil having a leading edge and a trailing edge and being generally symmetrical about a vertical plane extending between the leading and trailing edges, the front airfoil comprising a plurality of telescoping front airfoil sections, a rear airfoiil having a leading edge and a trailing edge and being pivotable about an axis defined between its leading and trailing edges, the rear airfoil being gnerally symmetrical about a vertical plane extending between the leading and trailing edges, the rear airfoil comprising a plurality of telescoping rear airfoil sections, the front and rear airfoil sections telescoping to permit reefing of the front and rear airfoils, and opera-

tive coupling means for opeatively coupling the front and rear airfoils so that rotation of the front airfoil about its axis effects



a counter-rotation of the rear airfoil about its axis to permit adjustment of the camber of the sail system.

4,685,411

HATCH FOR A BOAT

Cyril Wick, London, England, assignor to Topshore Limited, London, England

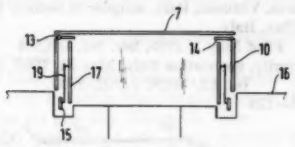
PCT No. PCT/GB85/00103, § 371 Date Nov. 14, 1985, § 102(e) Date Nov. 14, 1985, PCT Pub. No. WO85/04140, PCT Pub. Date Sep. 26, 1985

PCT Filed Mar. 15, 1985, Ser. No. 803,138

Claims priority, application United Kingdom, Mar. 16, 1984, 8406994

Int. Cl.[4] B63B *19/18*

U.S. Cl. 114—202 **9 Claims**



1. A boat comprising a hatch assembly for an opening in the coach roof of the boat, the hatch assembly comprising a roof part which is movable between a first position in which the opening is open and a second position in which the opening is closed, wherein the roof part is movable to a third position above and substantially in alignment with the second position, and wherein front and side walls are provided between the roof part and the coach roof when the roof part is in its third position.

4,685,412

SUBMARINE WEAPON DOLLY WITH SELF STOWING BANDS

Robert M. Harris, New Hope, and Neil G. Anderson, Minnetonka, both of Minn., assignors to FMC Corporation, Chicago, Ill.

Filed Feb. 14, 1986, Ser. No. 829,262

Int. Cl.[4] B63G *8/32*

U.S. Cl. 114—238 **30 Claims**

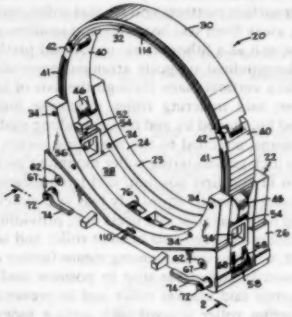
1. A weapon dolly, comprising:

means defining a base having a first continuous concave weapon engaging surface;

means defining a recess formed in said first concave surface;

means defining a rigid band of sufficient thickness to maintain a second concave weapon engaging surface in a predetermined arcuate shape while moving between a stowed position within said recess and a weapon clamping position with said first and second concave surfaces facing each other;

guide means between said base means and said band means



for guiding and maintaining a portion of said band within said recess in said base when in said stowed position; and

at least one clamping means connecting said band to said base when said band is in said weapon clamping position.

4,685,413

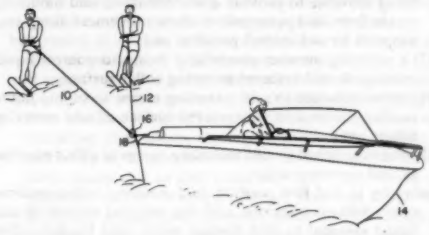
TANDEM WATER SKI TOWING DEVICE

Dennis Foreman, R.R. 3, Box 15, Fairland, Ind. 46126

Continuation of Ser. No. 515,457, Jul. 20, 1983, Pat. No. 4,579,075. This application Mar. 24, 1986, Ser. No. 843,122

Int. Cl.[4] B63B *21/56*

U.S. Cl. 114—253 **6 Claims**



1. A tandem water ski towing device for coupling first and second ski towlines to a ski boat, said towing device comprising a locking hook, said hook having a forward hook portion and a shaft extending rearwardly therefrom; and a towline carrier rotatably coupled to said shaft about the longitudinal axis of said shaft, said towline carrier including means for retaining the first and second towlines apart from each other in diametrically opposed positions with respect to said shaft, said shaft extending into said towline carrier to a point on a line between said towlines.

4,685,414

COATING PRINTED SHEETS

Mark A. DiRico, 416 Adams St., Quincy, Mass. 02169

Filed Apr. 3, 1985, Ser. No. 719,474

Int. Cl.[4] B05C *1/08, 11/10*

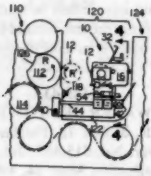
U.S. Cl. 118—46 **8 Claims**

1. Apparatus for applying a liquid coating to the surface of a sheet workpiece, said apparatus being adapted for operation on-line with the last unit of a lithographic sheet printing press, said unit comprising a blanket roller having a surface indentation, said coating application apparatus comprising:

(1) a metering roller rotatably mounted in mounting means, said metering roller having a textured longitudinal surface, said mounting means being linearly movably attached to a support platform fixed adjacent said last press

unit, and extending between the last press unit and a point remote from said unit, allowing movement of said metering roller and said mounting means between a first position in which said mounting means is continuously adjustably biased against said last press unit wherein said metering roller surface contacts said blanket roller, and a second position, away from said last press unit to allow use of said last press unit as a lithographic press, said platform comprising longitudinal supports arranged generally perpendicular to a vertical plane through the axis of said metering roller, said metering roller mounting means being supported by, guided by and movable along said supports;

(2) latch means, attached to the mounting means and positioned to lock said metering roller mounting means to said press unit in said first position, said latch means comprising a biasing means to adjustably bias said metering roller mounting means against said press unit, providing a steady even pressure between said blanket roller and said metering roller, wherein said mounting means further comprises a continuously adjustable stop to position said metering roller against said blanket roller and to prevent travel of said metering roller toward said surface indentation of



said blanket roller as said blanket roller rotates, said latch being movable to provide quick release of said mounting means from said press unit to allow movement along said supports to said second position; and

(3) a metering member comprising means to control liquid coating on said textured metering roller surface;

(4) means attached to said mounting means to supply liquid coating material to the textured surface of said metering roller; and

(5) means attached to said mounting means to effect rotation of said metering roller;

whereby in said first position, said metering roller continuously delivers a smooth, uniform, metered amount of said liquid material to said blanket roller, said blanket roller transferring said liquid material to said sheet workpiece, said latch allowing said mounting means, with its attached metering roller, liquid coating supply means, and metering roller rotation means, to be readily detached from and moved out of the way of the press unit, so that the press unit can be used as a lithographic press unit, and said latch means and adjustable stop allowing said metering roller and mounting means to be readily and reliably returned, locked and biased in the same said first position.

4,685,415

APPARATUS FOR ENVELOPING A BATTERY PLATE BY A DIP PROCESS

Paul C. Wegner, San Carlos, Calif., assignor to Tiegel Manufacturing Co., Belmont, Calif.

Continuation of Ser. No. 597,475, Apr. 6, 1984, Pat. No. 4,524,509, which is a continuation-in-part of Ser. No. 482,874, Apr. 7, 1983, abandoned, which is a continuation of Ser. No. 253,283, Apr. 13, 1981, abandoned. This application Apr. 29, 1985, Ser. No. 728,662

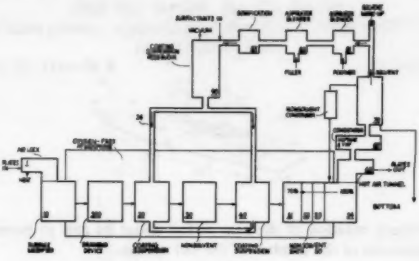
Int. Cl.[4] B05C *11/10, 3/05, 3/10*

U.S. Cl. 118—58 **5 Claims**

1. A coating application apparatus for use in forming an envelope of separator material around a battery plate, said apparatus comprising:

(a) a plurality of tanks wherein separate selected components for the production of said envelope can be housed, wherein at least one of said components comprises a solvent bearing compound, said tanks arranged in a sequential order for sequential dipping of a battery plate therein to form said envelope;

(b) a liquid attracting surface comprising a screen disposed between the first and second tank of said sequentially



arraged plurality of tanks, said surface attracting and retaining liquid thereon when contacted by a wet battery plate;

(c) a battery plate drying means disposed sequentially beyond the last tank of said plurality of tanks; and

(d) carrier means to hold battery plates in suspension and to transport said battery plates from tank to tank, to said liquid attracting surface, and to said drying means.

4,685,416

APPARATUS FOR CONTINUOUSLY APPLYING BITUMEN TO CABLES

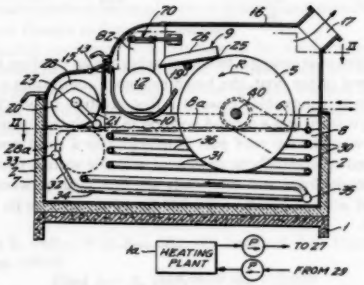
Sergio Olivares, Vittuone, Italy, assignor to Societa' Cavi Pirelli S.p.A., Milan, Italy

Filed May 1, 1986, Ser. No. 858,596

Claims priority, application Italy, May 31, 1985, 20994 A/85

Int. Cl.[4] B05C *11/02, 5/00*

U.S. Cl. 118—125 **9 Claims**



1. Apparatus for continuously coating a cable with a heated liquid bitumen, said apparatus comprising a tank, a trough disposed above the level to which the tank is to be filled with said liquid and for receiving a cable as it is advanced through said apparatus, means for continuously withdrawing said heated liquid from the tank and conveying it into said trough, heating means for heating said liquid bitumen and being adapted to operate at a temperature which will convert solid bitumen supplied to the tank into liquid bitumen, said heating means comprising heated fluid circulating pipes within said tank and disposed in positions in which they contact said liquid bitumen which is in said tank, a tiltable cradle disposed above the level to which the tank is to be filled with said liquid bitumen for receiving charges of solid bitumen and delivering said charges to said tank with tilting of said cradle, portions of said

pipes being disposed in the path of delivery of said charges by said cradle and below said cradle to provide a melting zone for melting said charges and being spaced from each other for subdividing any said charges bearing thereagainst, each portion of said pipes being connected to a manifold and extending downwardly from said manifold toward the bottom of said tank and said manifold being connected to an inlet for said heated fluid so that the heated fluid in said manifold and said portions of said pipes will have a temperature which is higher than the temperature of the heated fluid in the remainder of said pipes.

4,685,417

GLUING DEVICE FOR LABELING MACHINES

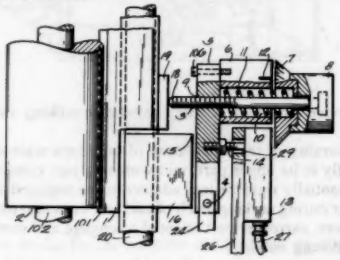
Hermann Kronseder, Regensburger Str. 42, 8404 Worth/Donau, Fed. Rep. of Germany

Filed Apr. 21, 1986, Ser. No. 853,971

Claims priority, application Fed. Rep. of Germany, Apr. 23, 1985, 3514618

Int. Cl.⁴ B05C *1/02*

U.S. Cl. 118—261 **4 Claims**



1. A device for applying glue to labels in a labeling machine comprising:

a roller on which excess glue is applied while rotating about a vertical axis,

a scraper blade swingable about an axis parallel to the roller axis toward and away from the periphery of the roller for reducing the glue to a film on the roller,

a stationary support and arm means mounted for pivoting about an axis on said support, said arm means having a threaded hole spaced from said axis,

an adjustment screw in said threaded hole extending from one side of said arm means and adjustable to set the distance said blade is allowed to swing relative to said roller,

manually engageable screw turning means on said screw means on the side of said arm means opposite of said one side, said screw turning means including a handle fastened to said screw means and an adjacent collar having a graduated scale thereon indicative of the distance between said blade and said glue roller and the thickness of the glue film,

said collar being coaxial with said handle and in frictional contact therewith, said collar being rotatable relative to said handle adjacent an index mark on said arm means, and

means for pressing said collar resiliently against said handle such that for any adjusted position of said screw means said collar may be turned relative to said handle to set the zero mark on said scale in line with said index mark.

4,685,418

POWDER REINFORCING MACHINE

Albert I. Morse, Beverly, Mass., assignor to USM Corporation, Farmington, Conn.

Filed Mar. 14, 1986, Ser. No. 839,846

Int. Cl.⁴ B05C *13/00, 13/02*

U.S. Cl. 118—503 **6 Claims**

1. A machine for depositing powder in a selected configuration, fusing the configured powder into a laminate and adhering the fused laminate to a shoe substrate comprising

a transfer structure including at least one face adapted to be rotated from a load position to a laminate adhering position,

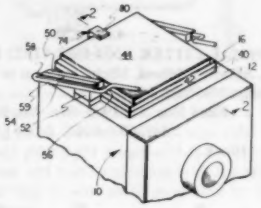
mounting plate means on which the shoe substrate is to be releasably clamped,

means for elevating said mounting plate means from a lower release position resting on said face to an upper clamping position,

a pair of lever arm means,

bracket means secured to said transfer structure face for mounting one of said pair of lever arm means one on each side of said mounting plate means for displacement from a release position to a clamping position,

said mounting plate means including means for displacing



each of said lever arm means from said release position by said clamping position,

each of said lever arm means including a support arm, configured so that a support portion will be parallel to and lower than said mounting plate means when said mounting plate means is in said clamping position, and

belt means secured to and stretchably secured between said support portions of said lever arm means,

said support portions being selectively located so that when said lever arm means are at said release position at least the front portion of said belt means will be elevated above said mounting plate means thereby permitting the loading or unloading of a shoe substrate on or from said mounting plate means and so that when said lever arm means are displaced to the clamping position, said belt means will forcefully engage said mounting plate means whereby a shoe part can be releaseably clamped therebetween.

4,685,419

METHOD AND APPARATUS FOR POWDER SURFACE TREATING

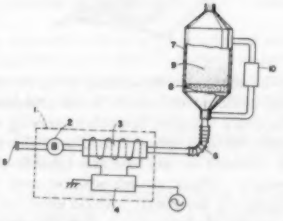
Takashi Nakajima, Hyogo, Japan, assignor to Nippon Paint Company, Ltd., Osaka, Japan

Filed Sep. 13, 1985, Ser. No. 775,886

Claims priority, application Japan, Sep. 14, 1984, 59-193514

Int. Cl.⁴ B05C *19/02*

U.S. Cl. 118—620 **6 Claims**



1. Apparatus for surface treating powder to improve disper-

sion thereof in a polar fluid by creating polar groups on the powder surface by blowing a gas including a reactive agent through the powder to produce polar groups, on the powder surface, having affinity for polar fluids, comprising:

a. enclosed reactor means including a porous plate therewithin for supporting said powder, said pores of said plate being smaller than particles of said powder,

b. means for blowing gas upwardly through said porous plate and through powder on said plate to fluidize said powder above said plate, and

c. means for producing reactive agent in said gas prior to gas passage through said plate and said powder resting thereon, said means having two kinds of electrodes in contact with a source of a high frequency high voltage signal is applied.

4,685,420

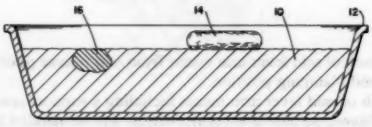
ANIMAL LITTER AND RELATED PROCESSES

Glenn A. Stuart, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 11, 1985, Ser. No. 807,625

Int. Cl.[4] A01K *1/015*

U.S. Cl. 119—1 **16 Claims**



13. A process for agglomerating animal urine to facilitate removal of the urine from a litter box, said process comprising contacting the animal urine with an animal litter in the litter box, said animal litter comprising a porous inert solid substrate in admixture with a dry, particulate water absorbent polymer.

4,685,421

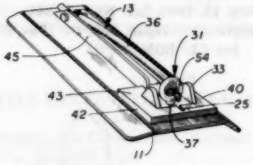
CATTLE/EWE ESTRUS DETECTOR DEVICE

Everett L. Colburn, Jr., 1340 Sycamore St., Gridley, Calif. 95948

Filed Mar. 24, 1986, Ser. No. 843,289

Int. Cl.[4] A01K *29/00*

U.S. Cl. 119—1 **10 Claims**



1. A device adapted to be secured to the rump of a cow, for determining cattle estrus, which device comprises:

a base having a frangible semaphore serving means therein,

a releasably secured spring loaded semaphore flag arm pivotally mounted on said base arm capable of movement to a generally vertical second position upon release from a first generally horizontal position upon the application of body weight of a second cow upon the rump of the wearer cow; and means to retain the semaphore in the first position.

4,685,422

AUTOMATIC APPLICATION OF TEAT CUPS

Roelof G. Middel, and Rinke Oenema, both of Oenkerk, Netherlands, assignors to Gascoigne-Melotte B.V., Emmeloord, Netherlands

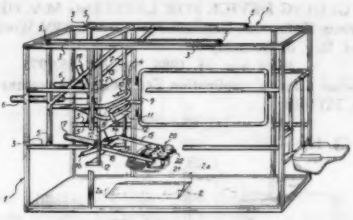
PCT No. PCT/NL84/00044, § 371 Date Aug. 30, 1985, § 102(e) Date Aug. 30, 1985, PCT Pub. No. WO85/02973, PCT Pub. Date Jul. 18, 1985

PCT Filed Dec. 20, 1984, Ser. No. 772,958

Claims priority, application Netherlands, Dec. 30, 1983, 8304498

Int. Cl.[4] A01J *5/00*

U.S. Cl. 119—14.13 **23 Claims**



1. A device for milking cattle, including a milking unit comprising:

(a) a plurality of teat cups, each of said cups widening upwardly in its upper part, said widening part comprising a substantially rigid casing, adapted to be engaged with an udder during milking, each of said teat cups also including a lower, narrower part adapted to engage and surround a teat during milking;

(b) a supporting structure for said teat cups, said structure including means for individually supporting each of said teat cups as a separate body, and means for moving said teat cups upwardly to a milking position for engagement with the teats; and

(c) means exerting a resilient upward pressure on the teat cups in the milking position, whereby the upper part of each of said teat cups is engaged with an udder and the lower part of each of said teat cups is engaged with a teat.

4,685,423

INSECTICIDAL GROOMING ARTICLE

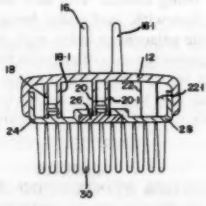
Rodney C. Baker, Leighton Buzzard, England, and Phillippus J. Van Rensburg, Randburg, South Africa, assignors to AECI Limited, Johannesburg, South Africa

Continuation-in-part of Ser. No. 594,531, Mar. 29, 1984, Pat. No. 4,604,971. This application Oct. 15, 1985, Ser. No. 787,138

Claims priority, application South Africa, Apr. 13, 1983, 83/2597

Int. Cl.[4] A01K *13/00*

U.S. Cl. 119—86 **3 Claims**



1. An article for grooming and controlling ectoparasites on an animal which includes a hand-grippable portion and a plurality of teeth or bristles of plastics material attached to the hand-grippable portion, with at least some of the teeth or bristles being flexible and containing at least one insecticide

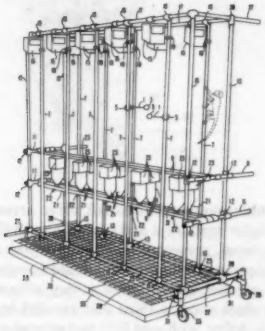
moulded therein, the insecticide being capable of blooming from the plastics material onto the outer surfaces of the teeth or bristles at a relatively slow rate when the article is not in use and at a relatively fast rate in use when the bristles are flexed so that an insecticidally effective amount of insecticide is thereby applied to an animal being groomed.

4,685,424

POLE-"HOUSING" FOR MONKEYS

Bernard Migler, 1405 Autumn La., Cherry Hill, N.J. 08003

Filed Aug. 14, 1986, Ser. No. 896,286
Int. Cl.[4] A01K *1/04*
U.S. Cl. 119—120 **16 Claims**



1. A device for the restraint or "housing" of monkeys comprising:

(a) a bottom support member;

(b) a plurality of vertical support members having first and second ends wherein the first ends are attached to the bottom support member;

(c) a top horizontal support member attached to second ends of the vertical support member;

(d) a plurality of vertical climbing poles having first and second ends attached at said first ends to the bottom support member and the second ends attached to the top horizontal support member;

(e) a plurality of horizontal perches attached to said vertical support members, spaced so that the perches are not in close proximity to the vertical climbing poles;

whereby one end of a tether can be attached to a ring which is slidably attached to each of said vertical climbing poles and the other end of the tether is attached to a collar holding an individual monkey that is restrained by the collar and is free to climb up and down the climbing pole to which it is attached and permitting a plurality of monkeys similarly attached to make close social contact without their tethers becoming entangled.

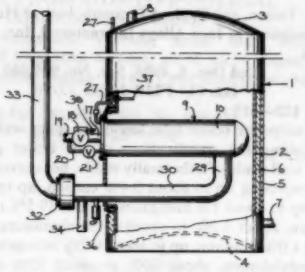
4,685,425

SUBMERSIBLE CHAMBER WATER HEATER

John P. Eising, Oconomowoc, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Filed Feb. 14, 1985, Ser. No. 701,963
Int. Cl.[4] F22B *5/00*
U.S. Cl. 122—17 **2 Claims**

1. A high efficiency water heating apparatus, comprising a tank to contain water to be heated, means for withdrawing heated water from the upper end of the tank, heating means for heating water in the tank and comprising a tubular member disposed in an opening in the side wall of the tank and extending across said tank, a burner disposed in said tubular member, fuel supply means for supplying a combustible fuel to said burner, means for supplying air to the burner to provide a combustible fuel-air mxiture, pilot light means for igniting said mixture and generating waste gases of combustion, a heat exchanger located beneath the tubular member, conduit means for conducting waste gases from the tubular member to the heat exchanger, a stack communicating with the heat exchanger for discharging said waste gases from said apparatus,



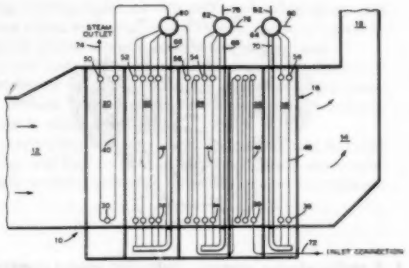
means for flowing said waste gases from the combustion chamber through said heat exchanger to said stack, a vent tube separate from said stack, one end of said vent tube being disposed adjacent said pilot light means and extending along the outside of said tank and communicating with the atmosphere, said vent tube serving to vent gases generated by burning of said pilot light means.

4,685,426

MODULAR EXHAUST GAS STEAM GENERATOR WITH COMMON BOILER CASING

Raymond G. Kidaloski, Canal Fulton; Harry S. Olinger, and Stephen A. Bryk, both of Akron, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed May 5, 1986, Ser. No. 859,550
Int. Cl.[4] F22B *25/00*
U.S. Cl. 122—214 **18 Claims**



1. A modular exhaust gas steam generator wherein each said module comprises:

(a) an open box frame through which hot exhaust gases travel, a portion of said frame being in contact with said gases;

(b) casing means fixedly secured to selected perimeter surfaces of said box frame thereby forming an integral part of said box frame for sealably closing said surface of said box frame and for retaining said gases within said box frame;

(c) tubing means extending within and nearly the height of said box frame, said tubing means being in contact with said hot gases for generating steam in said steam generator;

(d) header means within said box frame and connected to said tubing means for distributing fluid thereto, and;

(e) connecting means secured to an upper region of said box frame for top supporting said header and said tubing means;

whereby adjacent said modules are sealably secured together forming a unitary gas tight enclosure through which exhaust gases travel.

4,685,427

ALLOY FOR COMPOSITE TUBING IN FLUIDIZED-BED COAL COMBUSTOR

Curtis S. Tassen, and Gaylord D. Smith, both of Huntington, W. Va., assignors to Inco Alloys International, Inc., Huntington, W. Va.

Filed Dec. 8, 1986, Ser. No. 939,040
Int. Cl.[4] F22B *37/06, 37/10*
U.S. Cl. 122—511 **8 Claims**

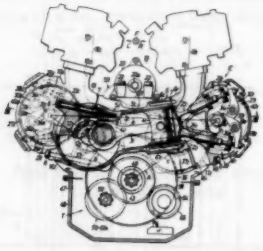
4. A composite boiler tube having an inner wall made of an alloy meeting the specifications of the boiler code and an exterior wall made of a thermally stable, hot corrosion resistant alloy comprising up to about 0.4% carbon, up to about 0.5% silicon, up to about 1% manganese, about 19.5% to about 24% chromium, about 3.2% to about 4.4% aluminum, about 0.1% to about 1.0% titanium, up to about 0.2% nitrogen, up to about 0.5% molybdenum, about 30% to about 35% nickel, up to about 1% copper, up to about 0.3% rare earth metal, up to about 0.5% zirconium, balance essentially iron.

4,685,428

MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

Takashi Inagaki; Toshio Shimada, and Tokuji Yoshimoto, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 15, 1985, Ser. No. 712,267
Claims priority, application Japan, Mar. 15, 1984, 59-50061; Mar. 15, 1984, 59-50062; Mar. 15, 1984, 59-50063; Mar. 15, 1984, 59-50064; Mar. 15, 1984, 59-50065; Mar. 15, 1984, 59-50066; Mar. 15, 1984, 59-50067; Mar. 15, 1984, 59-50068; Oct. 1, 1984, 59-205898
Int. Cl.[4] F02B *75/04*
U.S. Cl. 123—52 A **7 Claims**



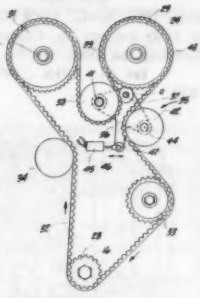
1. A multi-cylinder internal combustion engine comprising: first and second crankshafts disposed apart from and parallel with each other; first and second pistons operatively connected to said first and second crankshafts through connecting rods, respectively; first and second cylinders for slidably accommodating therein said first and second pistons, respectively; first and second cylinder heads positioned on one end of said first and second cylinders, respectively, each said cylinder head having overhead valves; first and second camshafts driving said overhead valves of each of said first and second cylinder heads, respectively; first and second crankcases within which said first and second crankshafts are rotably mounted, respectively; wherein both said crankshafts are interlocked with each other to rotate synchronously, and wherein said first and second cylinders are arranged adjacent to each other in an axial direction of said crankshafts, and wherein said first and second crankcases are displaced axially of said second and first camshafts, respectively; and said first and second camshafts being located overhead said first and second cylinder heads, respectively.

4,685,429

VALVE TIMING CONTROL MEANS FOR ENGINE

Takeshi Oyaizu, Kakegawa, Japan, assignor to Yamaha, Japan

Filed Oct. 2, 1985, Ser. No. 783,005
Claims priority, application Japan, May 14, 1985, 60-100524
Int. Cl.[4] F01L *1/34*
U.S. Cl. 123—90.31 **9 Claims**



1. In a double overhead camshaft drive arrangement comprising a cylinder head, first and second camshafts jounaled by said cylinder head, respective first and second driven pulleys affixed for rotation with respective of said camshafts about first and second, parallel axis, a drive pulley affixed for rotation with a drive shaft about a third axis parallel to said first and second axis to define with said first and second axes the apicies of a triangle, flexible transmitter means trained around said pulleys for driving the camshafts from said drive shaft, the improvement comprising an idler pulley disposed between said driven pulleys and rotatable about a fourth axis lying within the triangle, said flexible transmitter means passing over one of said driven pulleys then across said idler pulley and finally over the other of said driven pulleys and engaging substantially more than 180 degrees of the circumference of each of said driven pulleys and of said idler pulley, means for adjusting the timing relationship between the camshaft and the drive shaft comprising a timing lever supported for pivotal movement about an adjustment axis offset from the first, second and third axes, said idler pulley being carried by said timing lever, and means for pivoting said timing lever about its adjustment axis for rotating said camshafts relative to said drive shaft.

4,685,430

MOTOR VEHICLE EXHAUST GAS HEAT EXCHANGER FOR HEATING ENGINE COOLANT AND LUBRICATING OIL

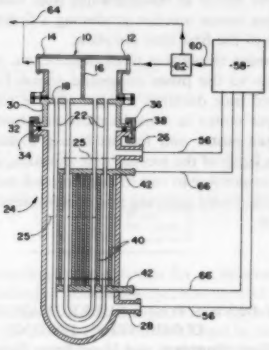
Ngy S. Ap, Villepinte, France, assignor to VALEO, Paris, France

Filed Mar. 19, 1986, Ser. No. 841,423
Claims priority, application France, Mar. 20, 1985, 85 04154; Mar. 20, 1985, 85 04155
Int. Cl.[4] F02N *17/02;* **F01M** *1/00*
U.S. Cl. 123—142.5 R **8 Claims**

1. In a combination of an internal combustion engine comprising a cooling circuit containing a cooling liquid and a lubricating circuit containing a lubricating liquid, and a heat exchanger comprising a bundle of tubes, a perforated plate in which the ends of said tubes are sealingly mounted, a fluid box fixed to said perforated plate opposite to said tubes with the ends of said tubes opening into said fluid box, means to introduce exhaust gas from said engine into said bundle of tubes at one end and to withdraw the gas from said bundle of tubes at the opposite end, the improvement comprising:

an envelope surrounding said bundle of tubes having an inlet means and an outlet means connected in said cooling circuit, said envelope being formed of a material adapted

to withstand at least approximately the highest expected temperature of the cooling liquid, but less than the highest expected temperature of the exhaust gas, a tubular element surrounding said bundle of tubes and interposed between said perforated plate and said envelope, said tubular element, said fluid box and said perforated plate being



formed of a material adapted to withstand the highest expected temperature of the exhaust gas, and at least one duct within said envelope in heat exchange relationship with the cooling liquid having inlet and outlet means passing through said envelope and being connected in said lubricating circuit.

4,685,431

EMERGENCY DEVICE FOR DIESEL ENGINES

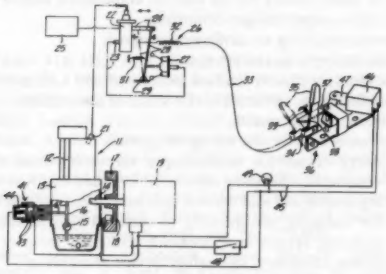
Kazuhiro Kubota, Hamamatsu, and Seiji Kondo, Kakegawa, both of Japan, assignors to Yamaha, Japan

Continuation of Ser. No. 742,196, Jun. 7, 1985, abandoned. This application Dec. 16, 1986, Ser. No. 942,066

Claims priority, application Japan, Jun. 9, 1984, 59-118870

Int. Cl.[4] F02B *77/08*

U.S. Cl. 123—198 DB **7 Claims**



1. A protection device for diesel engines driving a generator and having a lubricating system including a reservoir, a fuel injection system for injecting fuel into said engine for its operation, said fuel injection system including a control element movable between a fuel shutoff position wherein the supply of fuel to the engine is shut off and a fuel control position wherein fuel is supplied to the engine, holding means comprising a solenoid operated latch movable from a running position for holding said control element in its fuel control position for running of th engine and a shutoff position upon energization of said solenoid operated latch for movement of said control element to its shutoff position for stopping of the engine, and means responsive to the level of lubricant in said reservoir for energizing said solenoid operated latch from the output of said generator to its shutoff position when the level in said reservoir falls below a predetermined amount.

4,685,432

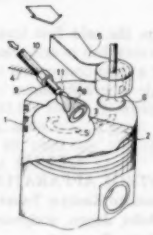
METHOD AND DEVICE FOR FORMING MIXTURE GAS IN DIRECT INJECTION TYPE INTERNAL COMBUSTION ENGINE

Akinori Saito; Masatoshi Yamada; Kenji Imai; Kiyomi Kawamura, and Masanobu Kimura, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Oct. 30, 1984, Ser. No. 666,418

Int. Cl.[4] F02B *19/08*

U.S. Cl. 123—276 **16 Claims**



1. A mixture gas formation method for a direct fuel injection type internal combustion engine having a piston with a recess forming a combustion space, air intake means with swirling means for swirling intake air to be supplied to said combustion space, and an intermittent type swirl injection nozzle having at least one tangential passage for swirling fuel, for jetting fuel in substantially conical form through an injection hole thereof into said swirling intake air, to form a mixture gas, comprising the steps of:

supplying swirling intake air into said combustion space, said swirling intake air having a swirl speed in conformance to the speed of said internal combustion engine, and

spraying fuel from said swirl injection nozzle into said swirling intake air in said combustion space at a fuel spray angle, defined as the angle of said conical form, varied in response to said engine speed,

thereby controlling the spray travel distance of said fuel and allowing said fuel to float in said combustion space substantially without adhering to a wall of said combustion space.

4,685,433

RPM GOVERNOR FOR FUEL INJECTION PUMPS

Ilija Djordjevic, Windsor, Conn., assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Aug. 12, 1985, Ser. No. 764,694

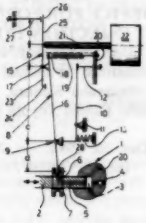
Claims priority, application Fed. Rep. of Germany, Oct. 1, 1984, 3435986

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—373 **20 Claims**

1. An rpm governor for fuel injection pumps of internal combustion engines, comprising an electric control motor triggered via a parameter processing electronic control unit including a quantity control member which determines the injection quantity, said quantity control member being actuated by said control motor, a governor lever arranged to transmit a control variable of said control motor to said quantity control member, said governor lever being pivotable about a shaft and adapted to be urged in an adjusting direction of decreasing injection quantity by a spring, said governor lever further including first and second lever parts, said second lever part being adapted to cooperate with said quantity control

member, said first lever part being pivotable about a hinge on said second lever part and further being adapted to cooperate with a stationary pivot stop and being directly acted upon by said control motor between said hinge and an abutment point



of said pivot stop, the said first lever part having coupling means adapted to establish in one selected pivot range of said second lever part a rigid connection to said second lever part up to a pivot angle where abutment of said first lever part to said pivot stop occurs.

4,685,434

ELECTRIC CONTROL APPARATUS FOR CARBURETOR

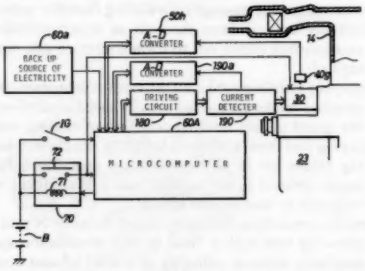
Tsuneo Ando; Kazusato Kasuya; Takeru Yasuda, and Yukitoshi Asada, all of Oobu, Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Oobu, Japan

Filed Dec. 11, 1985, Ser. No. 807,663

Claims priority, application Japan, Dec. 12, 1984, 59-261994; Oct. 28, 1985, 60-240943

Int. Cl.[4] F02D *41/00*

U.S. Cl. 123—438 **7 Claims**



1. An electric control apparatus for a carburetor adapted to internal combustion engines, said carburetor having a body formed therein with an intake conduit, a flow control element axially movable within a passage such as an air bleed passage in said body for controlling the cross-sectional area of said passage in accordance with axial displacement thereof, and a stepper motor mounted on said body for effecting the axial displacement of said flow control element, the electric control apparatus comprising:

first means for producing a first electric signal indicative of the operating condition of said engine;

second means responsive to said first electric signal for determining rotary steps of said stepper motor for controlling the cross-sectional area of said passage in an optimum value in relation to the operating condition of said engine;

third means for determining whether or not the number of said determined rotary steps is more than the actual rotary steps of said stepper motor, if so producing a first command signal and if not, producing a second command signal; and

fourth means responsive to said first command signal for producing a first control signal for effecting one rotary step of said stepper motor in a direction defined by said first command signal and further responsive to said second command signal for producing a second control signal for effecting one rotary step of said stepper motor in the other direction defined by said second command signal;

wherein said control apparatus further comprises:

fifth means responsive to one of said control signals for determining a first time duration for one rotary step of said stepper motor in consideration with loads acting on said stepper motor and for producing a first time signal upon lapse of the first time duration;

sixth means responsive to change of one of said command signals to the other command signal for determining a second time duration for one reverse rotary step of said stepper motor in consideration with loads acting on said stepper motor and for producing a second time signal upon lapse of the second time duration; and

means responsive to one of said first and second time signals for selectively applying said control signals to said stepper motor.

4,685,435

SAFETY DEVICE FOR A SUPERCHARGED INTERNAL COMBUSTION ENGINE

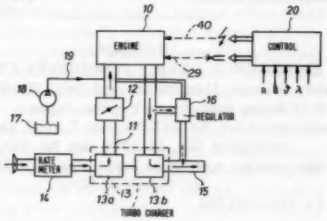
Helmut Denz, Stuttgart, and Hans-Peter Stumm, Hemmingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jul. 10, 1981, Ser. No. 282,339

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1980, 3026150

Int. Cl.[4] F02M *51/00*; F02D *33/00*; F02P *5/04*

U.S. Cl. 123—478 **5 Claims**



1. A safety device for an internal combustion engine operated with a supercharger comprising:

means supplying an air-flow rate signal;

means supplying an rpm signal;

the quotient of said air-flow rate signal and said rpm signal defining the volumetric efficiency of said engine;

a fuel metering system;

a control unit for the timing of ignition;

a safety device for monitoring a threshold value of said volumetric efficiency connected between said fuel metering system and said control unit, said device having means for reducing the quantity of metered fuel to said fuel metering system in accordance with said value of volumetric efficiency, said safety device comprising

a first comparison means responsive to a timing element coupled to said air flow rate signal means and to said rpm signal means and producing an output,

a timing means responsive to the output of said first comparison means and producing an output to decontrol said fuel metering system,

a second comparison means responsive to the output of said timing means and responsive to said timing element and producing an output coupled to control said fuel metering system, and

an ignition-angle correction means responsive to said output of said second comparison means and producing an output coupled to said control unit for determining the instant of ignition.

4,685,436

FUEL INJECTION CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

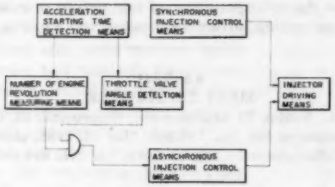
Hidehiro Oba, Nagakute, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Jul. 25, 1986, Ser. No. 889,463

Claims priority, application Japan, Aug. 8, 1985, 60-174690

Int. Cl.[4] F02D *41/10*

U.S. Cl. 123—492 **8 Claims**


ACCELERATION STARTING TIME DETECTION MEANS
SYNCHRONOUS INJECTION CONTROL MEANS
NUMBER OF ENGINE REVOLUTION MEASURING MEANS
THROTTLE VALVE ANGLE DETETION MEANS
INJECTOR DRIVING MEANS
ASYNCHRONOUS INJECTION CONTROL MEANS

1. In a fuel injection control device for an internal combustion engine including synchronous injection control means for controlling a fuel injection amount synchronously with a signal generated at every predetermined crank angle in said internal combustion engine, asynchronous injection control means for controlling the fuel injection amount according to an output signal from means for detecting a time of acceleration, and injector driving means for driving a fuel injector according to output signals from said synchronous injection control means and said asynchronous injection control means; the improvement comprising:

acceleration starting time detection means for detecting an acceleration starting time;

number of engine revolution measuring means for measuring number of engine revolutions from the acceleration starting time;

throttle valve angle detection means for detecting that a throttle valve angle is equal to or more than a predetermined angle after start of acceleration; and

means for operating said asynchronous injection control means when said number of engine revolution measuring means measures a value equal to or less than a predetermined number of engine revolutions and said throttle valve angle detection means generates a signal equal to or more than a predetermined throttle valve angle signal.

4,685,437

INTAKE AIR HEATER FOR INTERNAL COMBUSTION ENGINE WITH PERFORATED PLATE HEATER ELEMENT PARTIALLY TRAVERSING AIR PASSAGE

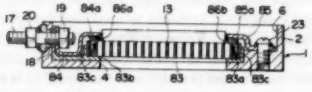
Toshiaki Tanaka, Toyota; Hitoshi Niwa, Kariya; Hirokatsu Mukai, Kariya; Naoto Miwa, Kariya; Akio Nara, Kariya; Etsuji Nomura, Kariya; Makoto Hori, Kariya; Koichi Hasegawa, and Hiroshi Noguchi, both of Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Nippondenso Kabushiki Kaisha, Kariya, both of, Japan

Filed Sep. 5, 1985, Ser. No. 772,904

Claims priority, application Japan, Sep. 5, 1984, 59-134890[U]; Sep. 5, 1984, 59-134891[U]; Sep. 5, 1984, 59-134892[U]; Sep. 5, 1984, 59-134893[U]; Sep. 5, 1984, 59-134894[U]; Sep. 5, 1984, 59-134895[U]

Int. Cl.[4] F02M *31/12*

U.S. Cl. 123—549 **3 Claims**



1. An air heater for heating intake air for an internal combustion engine, comprising a frame means for defining an opening for passing air therethrough, and at least one piece of heater element in the shape of a perforated plate supported by said frame means so as to traverse a predetermined part of the opening area of said opening, a substantial part of said opening area being left free as untraversed by said heater element wherein said frame means is an annular frame means which defines said opening by inner peripheral edges thereof, and which has an annular groove formed along inner peripheral portions thereof so as to extend from said inner peripheral edges into said frame means toward outer peripheral portions thereof, said heater element being supported by said frame means with a first part thereof being received in said annular groove, while a second part thereof is exposed to the opening area of said opening and wherein said annular frame means is an assembly of two annular frame members joined together along a border extending through and including bottom portions of said annular groove.

4,685,438

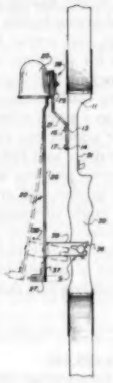
ARCHERY BOW QUIVER

Marlow Larson, 2735 S. 4050 West, Ogden, Utah 84401

Filed Jan. 10, 1986, Ser. No. 818,191

Int. Cl.[4] F41C *33/00*

U.S. Cl. 124—24 A **9 Claims**



1. A system for attaching a quiver to an archery bow, said archery bow having a handle and a handle riser, said quiver including a vertical support member having an arrow shaft-retaining element at its lower end and an arrow point guard at its upper end, said system comprising: a mounting support strap having a first element removably connectable to said first element, extending upwards and spaced from but approximately parallel to said first element, said said element including a socket having an opening of irregular configuration;

a connector member fixed to said vertical support member in the vicinity of said point guard, said connector member having a configuration compatable with the configuration of said opening and being insertable into said socket through said opening when said quiver is oriented in a first position and to permit rotation of said quiver with respect to said vertical support member to a second position, said socket and said connector member being mutually adapted to couple when said quiver is moved to said second position; and

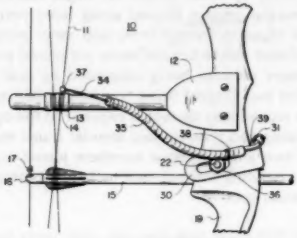
means for anchoring said vertical support member in rigid relationship with respect to said socket at a location spaced from said socket.

4,685,439

AUTOMATICALLY-RELEASED ARROW HOLDER

Victor A. Cosentino, Jr., 524 New Jersey Ave., Bricktown, N.J. 08723

Filed Aug. 19, 1985, Ser. No. 766,584
Int. Cl.[4] F41D *10/00*
U.S. Cl. 124—41 A **1 Claim**



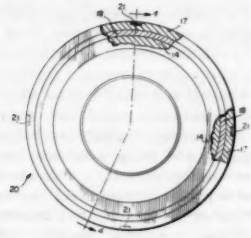
1. An automatically-releasable device for holding an arrow in shooting position on a compound action bow comprising a mounting bracket; means for securing said mounting bracket to said bow above the handle portion of said bow and adjacent to an arrow rest, on the other side of said handle from said arrow rest; a holder arm hinged to said bracket, on said other side of said handle; an arrow holder attached to the end of said holder arm, extending around said handle to said arrow rest; said holder arm and, said arrow holder having a first position securing said arrow between said arrow holder and said arrow rest, and a second position with said arrow holder clear of said arrow releasing said arrow for shooting; said compound bow having an outer cable for nocking and shooting said arrow, and inner cables for completing said compound action; a string having one end connected to a given point on said one of said inner cables and means for connecting the other end of said string to said holder arm to draw said holder arm slowly from said first position to said second position when said outer cable is drawn, to automatically release said arrow for shooting, a flexible tubular protective guide surrounding said string; and means for securing said protective guide to said bracket with one end directed toward said given point on said one of said inner cables and another end of said protective guide directed toward said means for connecting said other end of said string to said holder arm.

4,685,440

ROTARY DRESSING TOOL

Warren J. Owens, Columbia, S.C., assignor to Wheel Trueing Tool Company, Columbia, S.C.

Filed Feb. 24, 1986, Ser. No. 832,350
Int. Cl.[4] B24B *53/14*
U.S. Cl. 125—11 CD **6 Claims**



1. A rotary dressing tool to reform and recondition an abrasive wheel, comprising:

a cylindrical metal core, having a bore hole, which serves as a framework for said tool and permits said tool to be readily mounted to the driving spindle of a dressing assembly, and

a matrix of abrasive resistant nickel based alloy bonded to said cylindrical metal core, and

diamond particles dispersed about the outer periphery of said tool and embedded in said matrix to provide a basic cutting surface for dressing said abrasive wheel, and

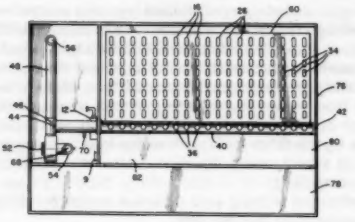
three or more profiled segments of sintered polycrystalline synthetic diamond material interspersed in said diamond particles and matrix as an integral part thereof and spaced about the outer periphery of said tool to provide an enhanced cutting surface for dressing said abrasive wheel.

4,685,441

HEAT EXCHANGER

Kenneth C. Yanko, 39 Arlington Dr., Romeoville, Ill. 60441

Continuation of Ser. No. 739,809, May 31, 1985, abandoned. This application Jul. 11, 1986, Ser. No. 884,690
Int. Cl.[4] F24H *3/00*
U.S. Cl. 126—116 R **9 Claims**



1. A heat exchanger comprising a heat source to heat gases, a heat transfer assembly having intake means to receive said heated gases from said heat source, heat transfer means to transfer heat from said gases to raise the temperature of items brought into the vicinity of said heat transfer assembly, outlet means to discharge said gases after heat has been transferred therefrom, said heat transfer assembly being vertically positioned having an upper end and a lower end, said outlet means including an outlet conduit terminating at an outlet aperture, said outlet conduit being horizontally disposed when said heat transfer assembly is in said vertical position, said outlet conduit being located nearer said lower end than said upper end of said heat transfer assembly, said outlet conduit having a central axis extending in a first direction, a vacuum creating conduit including an elongated portion having a central axis and positioned relative to said outlet conduit whereby said central axis of said elongated portion of said vacuum creating conduit is in line with said central axis of said outlet conduit and extends in a second direction substantially normal to said first direction, said outlet aperture of said outlet conduit being connected to and opening to said elongated portion of said vacuum creating conduit at an intermediate point thereof spaced apart from each end thereof, said vacuum creating conduit having an intake end portion extending from one end of its said elongated portion and an outlet end portion extending from the opposite end of its said elongated portion, said vacuum creating conduit having a passageway of substantially uniform corss-section and unobstructed from at least its intake end to said intermediate point where said outlet aperture of said outlet conduit opens to said vacuum creating conduit, a relatively low temperature air source, said intake end portion of said vacuum creating conduit having an intake aperture opening to said relatively low temperature air source, said vacuum creating conduit including a blower connected therein at a location between said intake aperture of said intake end portion and the point at which said outlet aperture of said outlet conduit opens to said elongated portion of said vacuum creating conduit, said outlet end portion of said vacuum creating conduit having a discharge aper-

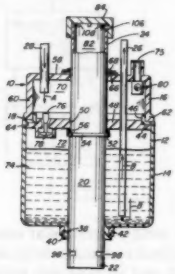
ture, said blower being operative to draw relatively low temperature air from said relatively low temperature source into said intake aperture of said vacuum creating conduit and blow said relatively low temperature air through said vacuum creating conduit past said outlet aperture of said outlet conduit of said heat transfer assembly opening to said vaccum creating conduit in a direction substantially perpendicular to the direction of air flow in said outlet conduit as it passes toward the said outlet aperture of said outlet conduit, a partial vacuum being thereby created at said outlet aperture by operation of said blower to draw gases from said heat transfer assembly after heat has been transferred therefrom, said gases being drawn from said outlet aperture having a relatively higher temperature, said relatively low temperature air in said vacuum creating conduit being heavier than said relatively higher temperature gases at said outlet aperture to retard flow of said gases from said heat transfer assembly until most of the heat has been taken up and transferred by said heat transfer means whereby the temperature of said gases eventually lowers toward that of the relatively low temperature air in said vacuum creating conduit and the weight of said gases increases toward that of said heavier air in said vacuum creating conduit, said gases being thereupon immediately drawn from said heat transfer assembly as soon as their heat has been taken up and transferred making room for newly heated gases to continuously enter said heat transfer assembly as soon as the preceding gases have given up their heat.

4,685,442

PORTABLE HEATER FOR WEARING APPAREL

Leonard Cieslak, 15 Creek Rd., McKees Rocks, Pa. 15136

Filed Jan. 20, 1987, Ser. No. 5,268
Int. Cl.[4] A61F *7/08*
U.S. Cl. 126—204 **20 Claims**



1. In a portable heater for heating an article of wearing apparel or the like and comprising a compact closed container which defines a heating chamber for containing a liquid heat transfer medium therein and a second container received in the closed container in heat exchange relationship with the liquid heat transfer medium contained in the heating chamber, the second container being adapted to receive a heat evolving means therein, and conduit means communicating between the closed container and such an article of wearing apparel to define a flow circuit within which the contained heat transfer medium can circulate from the closed container to the article wearing apparel and back again thereinto the improvement comprising:

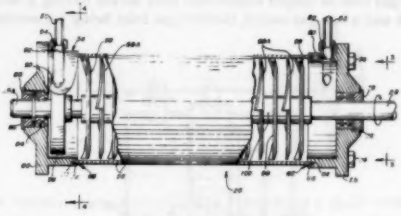
said heating chamber comprising a variable volume chamber having resiliently deformable portions which are deformable to provide a pumping action that imparts a flow impetus to said heat transfer medium within said heating chamber to induce circulation thereof within such flow circuit.

4,685,443

HYDRAULIC FRICTION HEAT GENERATOR

Ronald V. McMurtry, Welcome, Minn., assignor to Lloyd S. Myster, Fairmont, Minn., a part interest

Continuation-in-part of Ser. No. 862,468, May 12, 1986, abandoned. This application Jan. 15, 1987, Ser. No. 4,093
Int. Cl.[4] F24C *9/00*
U.S. Cl. 126—247 **22 Claims**



1. A hydraulic friction heat generator filled with hydraulic heat transfer fluid, comprising:

a cylindrical housing with a central axis through its interior and with end plates generally normal to said central axis, said generator having an inlet conduit means and an outlet conduit means located at opposite ends of the cylindrical housing thereof;

a drive shaft bearingly mounted in each of said end plates in coaxial alignment with said central axis and passing through one of said end plates to extend outwardly therefrom;

an external power source joined to said extended shaft for rotating said shaft; and

a plurality of smooth-surfaced thin discs with outer generally annular peripheral edges closely-spaced from the inner wall of said cylindrical housing, said discs being fixedly mounted in axially spaced relationship on said drive shaft to be rotated thereby in a single direction, with no stationary elements interposed between said discs, each said disc having at least two radially-oriented slits partially transecting said disc to extend inward from said disc peripheral edges, and said discs having a portion of each said disc on one side of said slit feathered outward from the plane of said disc to form a vane for turbulently forcing said hydraulic fluid axially toward said outlet conduit means.

4,685,444

PROCESS AND EQUIPMENT FOR HEATING A LIQUID WITHOUT POLLUTION OF THE ENVIRONMENT

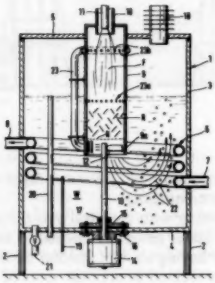
Willy Dürrenberger, Augsterstrasse 21, CH-4133 Pratteln, Switzerland

Filed Jan. 24, 1985, Ser. No. 694,461
Claims priority, application Switzerland, Feb. 8, 1984, 627/84; Apr. 19, 1984, 1960/84
Int. Cl.[4] F24H *1/20*
U.S. Cl. 126—360 A **12 Claims**

1. An apparatus for direct heating of a liquid by hot gases avoiding the discharge of pollutants into the environment, comprising tank means containing a liquid with an absorbant, burner means having a burning chamber defined at least in part by an outer surface and situated above the liquid upper level, a hot-gas tube arranged within said tank means having a hot-gas inlet and a hot-gas outlet, the hot-gas inlet being connected to the burner means, and out-flow opening provided within the tank means for the hot-gases, at least the hot-gas outlet of the hot-gas tube dips into the liquid, and means is provided within the hot-gas tube for generating a suction effect directed into the liquid and for effecting turbulent motion of the hot-gases within the liquid, the apparatus further comprising precooling means for precooling the hot-gases, said precooling means

having tube means for transferring the liquid to the burning chamber in order to continuously cool it by flowing the liquid along the outer surface of the burning chamber and preventing overheating of the gases present in said burning chamber.

7. An apparatus for direct heating of a liquid by hot-gases avoiding the discharge of pollutants into the environment, comprising tank means containing a liquid with an absorbant, burner means having a burning chamber defined at least in part by an outer surface and situated above the liquid upper level, a hot-gas tube arranged within said tank means having a hot-gas inlet and a hot-gas outlet, the hot-gas inlet being connected to



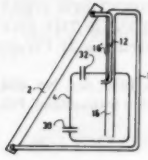
the burner means, an outflow opening provided within the tank means for the hot-gases, at least the hot-gas outlet of the hot-gas tube dips into the liquid; and means is provided within a prolongated portion of the hot-gas tube for generating a suction effect directed into the liquid and for effecting turbulent motion of the hot-gases with the liquid, the apparatus further comprising precooling means for precooling the hot gases, said precooling means having the tube means for transferring the liquid to the burning chamber in order to continuously cool it by flowing the liquid along the outer surface of the burning chamber and preventing overheating of the gases present in said buring chamber.

4,685,445

SOLAR HEATER

Pessach Seidel, 1 Rashba Street, Jerusalem, Israel

Filed Mar. 12, 1986, Ser. No. 838,627
Int. Cl.[4] F24J *3/02*
U.S. Cl. 126—434 **20 Claims**



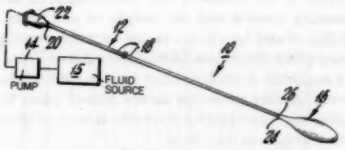
1. A thermosyphonic solar heater comprising a solar collector for heating a liquid by solar radiation, said collector having an inlet socket and an outlet socket, a tank into which said heated liquid is transferred by thermosyphonic action, a hot-liquid, outlet pipe leading from said outlet socket to the top region of said tank and a cold-liquid, return pipe leading from the bottom region of said tank to said inlet socket, said hot-liquid pipe having a downwardly extending portion ending at, and opening into, said top region, and said cold return pipe having an upwardly extending portion beginning at, and open towards, said bottom region, and a downwardly extending portion, the upper end of the upwardly extending portion of said return pipe communicating with the upper end of the downwardly extending portion thereof, wherein a proportion of said upwardly extending portion of said return pipe is in at least indirect thermal contact and heat exchange relationship with at least some of the liquid inside said downwardly extending portion of said hot-liquid pipe and inside said storage tank, whereby forward thermosyphonic circulation is produced when said collector is heated by solar radiation, but reverse circulation is substantially inhibited when said collector cools down in absence of solar radiation.

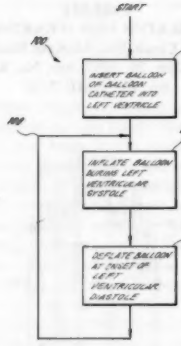
4,685,446

METHOD FOR USING A VENTRICULAR ASSIST DEVICE

Daniel S. J. Choy, 892 Riverbank Rd., Stamford, Conn. 06903

Filed Feb. 21, 1984, Ser. No. 582,118
Int. Cl.[4] A61M *29/02*
U.S. Cl. 128—1 D **8 Claims**





1. A method for using a ventricular assist device having a catheter with a proximal end and a distal end, a pump secured to the proximal end, and an inflatable balloon secured to the distal end, the pump being capable of inflating the balloon, comprising the steps of:

pushing the balloon through a mitral valve into the left ventricle of a patient's heart;

inflating the balloon during left ventricular systole with the catheter extending through the mitral valve;

deflating the balloon during left ventricular diastole with the catheter extending through the mitral valve; and

repeating the inflating and deflating steps.

4,685,447

TISSUE EXPANDER SYSTEM

Alfred A. Iversen; William J. Eastman, both of Hopkins, and Allen L. Van Beek, Edina, all of Minn., assignors to PMT Corporation, Hopkins, Minn.

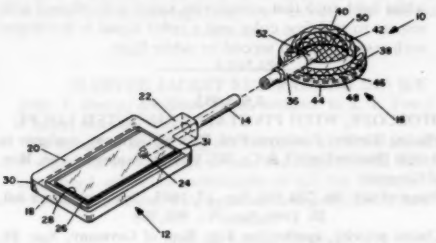
Filed Mar. 25, 1985, Ser. No. 715,457
Int. Cl.[4] A61B *19/00;* **A61F** *2/02;* **A61M** *29/00*
U.S. Cl. 128—1 R **29 Claims**

1. Tissue expander for insertion between skin and flesh comprising:

a. one piece molded member of an and a finite thickness and

assuming a predetermined geometrical shape, said member including a lower surface and an upper surface with a molded edge formed by said surfaces, and an internal cavity therein;

b. tube means secured to and extending partially into said cavity providing for fluid to pass into said member; and



c. at least one sheet of non-stick PTFE material positioned between said upper and lower surface assuming said geometrical shape, and adjacent to an inner portion of said edge.

4,685,448

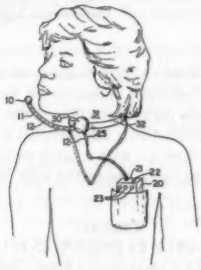
VOCAL TACTILE FEEDBACK METHOD AND ASSOCIATED APPARATUS

George H. Shames, and William L. Torgeson, both of Pittsburgh, Pa., assignors to University of Pittsburgh, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 540,180, Oct. 11, 1983. This application Nov. 14, 1985, Ser. No. 798,240

Int. Cl.[4] G09B *19/04*

U.S. Cl. 128—1 R **2 Claims**



1. A vocal tactile feedback method for use in the treatment of speech or hearing abnormalities or otherwise enhancing speech operability of a person through providing enhanced awareness of phonatory behavior to the person comprising the steps of

providing a microphone for producing an electronic signal responsive to the person's vocal utterances,

providing amplifier means for amplifying said electronic signal,

delaying said amplified signal with delaying circuit means for a desired time interval,

progressively during the overall course of said treatment reducing the duration of said time interval, and

providing said delayed signal to an electro-mechanical transducer disposed in contact with an outer surface of the laryngeal region on the neck of the person to provide delayed tactile feedback to the person of the said vocal utterances which may be spoken by the person, whereby the feedback will enhance the awareness of the person of said vocal utterances.

4,685,449

URETERO-RENOSCOPE

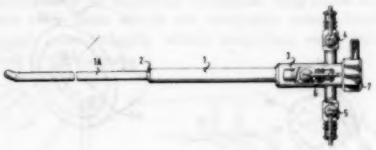
Ludwig Bonnet, Jahnstrasse 28, 7134 Knittlingen, Fed. Rep. of Germany

Filed Jan. 29, 1986, Ser. No. 823,627

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1985, 3504252

Int. Cl.[4] A61B *1/00*

U.S. Cl. 128—4 **3 Claims**



1. A uretero-renoscope assembly comprising a shaft with a longitudinal passage therethrough, a distal portion of said shaft being of a reduced diameter relative to a proximal portion of said shaft, said shaft on a proximal end having a coupler housing, interchangeable first optical system with a forward viewing angle and a second optical system with a divergent angle of view, said first optical system including a casing, an optical guide means being eccentrically mounted in said casing and axially extending from said casing, an angled eye piece extending from said casing and connected to said optical guide means, a light source connector means on said casing, an instrument passage extending through said casing, attachment means for connecting an insertion element to a proximal end of said casing, said instrument passage being open at its end remote to the attachment means to allow at least a stone-disintegration device to be inserted through the instrument passage and be adjacent at distal end of the optical guide means, said first optical system being inserted into the longitudinal passage of the shaft with the casing engaging the coupler housing and the distal end of the optical guide means and the stone-disintegration device carried in said instrument passage extending to the distal end of said shaft, said first optical system being removable from said shaft to allow insertion of the second optical system so that on completion of a stone-disintegration, the second optical system can replace the first system to enable optical examination of the area without removal of the shaft.

4,685,450

ENDOSCOPE

Ian P. Collins, Welwyn, and William J. Revell, Great Dunmow, both of England, assignors to Warner Lambert Technologies, Inc., Southbridge, Mass.

Continuation of Ser. No. 670,974, Nov. 15, 1985, abandoned. This application Aug. 15, 1986, Ser. No. 898,737

Claims priority, application United Kingdom, Nov. 12, 1983, 8330241

Int. Cl.[4] A61B *1/06*

U.S. Cl. 128—4 **5 Claims**

1. A method of focusing an endoscope for the purpose of photographing the endoscope field of view comprising the steps of:

providing an camera,

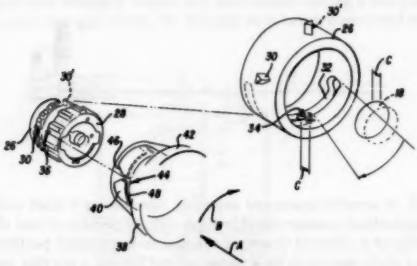
providing an endoscope having a handle casing, an adjustable lens system including an eyepiece mounted within the casing, and an adjusting ring rotatably carried by the casing and operatively connected to the lens system to permit rotation of the adjusting ring relative to the casing between a first position at which the field of view of the endoscope is focused for viewing with the eye and a second position at which said field of view is focused for photographing with the camera,

positioning the adjusting ring in said first position,

providing a coupling for connecting the endoscope to the

camera wherein the coupling includes an annular body having one end adapted to be coupled to a camera and another end adapted to accept a portion of the casing and be releasably attached thereto as said another end is operatively positioned about the casing and rotated relative thereto between a release condition at which the coupling can be removed from the casing and a fully locked condition, the coupling and the adjusting ring including means joining the adjusting ring to the annular body and cooperating with one another so that when said another end of the annular body is positioned about the casing and the annular body is rotated relative to the casing between said release and fully locked conditions, the adjusting ring is rotated between said first and second positions, and

operatively positioning said another end of the coupling annular body about the casing and rotating the body relative to the casing from said release to said fully locked conditions to thereby rotate the adjusting ring from said first to said second positions.



4,685,451

ENDOSCOPE APPARATUS USING SOLID STATE IMAGE PICKUP DEVICE

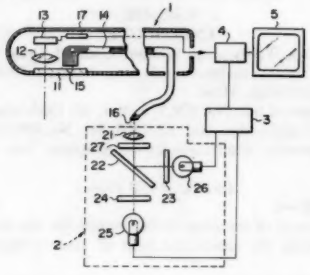
Kunio Ando, Yono, Japan, assignor to Fuji Photo Optical Co., Ltd., Japan

Continuation of Ser. No. 415,801, Sep. 8, 1982. This application Sep. 9, 1985, Ser. No. 773,654

Claims priority, application Japan, Sep. 12, 1981, 56-144407; Sep. 12, 1981, 56-144408

Int. Cl.[4] A61B *1/06*

U.S. Cl. 128—6 **13 Claims**



1. An improved endoscope comprising:

means for emitting alternately colored beams of light onto a subject, a first one of said beams comprising a first color of light, and a second one of said beams comprising either a second color of light or white light;

lens means for collecting said alternating beams of light, having been reflected from said subject;

a self-scanning one-plate solid state image forming device, comprising a number of individual elements disposed with respect to said lens such that said light collected by said lens falls thereon and is detected thereby;

means coupled to said image forming device for developing resolution and color signals; and

filter means interposed betwen said lens means and said self-scanning solid state image forming device, said filter comprising filter elements of plural colors, each of which elements are substantially transparent to said first color of light but which selectively filter said second color or white light, such that a resolution signal is developed with respect to said first color and a color signal is developed with respect to said second or white light.

4,685,452

OTOSCOPE, WITH PIVOTALLY MOUNTED LOUPE

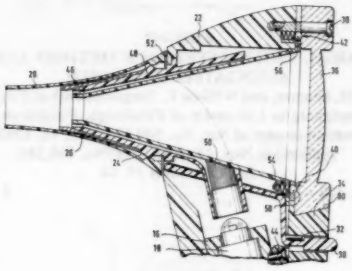
Karlheinz Riester, Juningen, Fed. Rep. of Germany, assignor to Rudolf Riester GmbH & Co. KG Fabrik, Juningen, Fed. Rep. of Germany

Division of Ser. No. 724,194, Apr. 17, 1985. This application Jul. 30, 1986, Ser. No. 890,508

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1984, 3414730

Int. Cl.[4] A61B *1/22*

U.S. Cl. 128—9 **5 Claims**



1. An otoscope comprising a housing including a housing head and a loupe pivotally mounted on said housing head around a pivot means parallel to viewing axis of the otoscope, the loupe being provided on a side directed toward the examination field of the otoscope with a catch recess for engaging a spring-load spherical catch associated with the housing head.

4,685,453

THERMOFORMABLE ELEMENT AND USE THEREOF

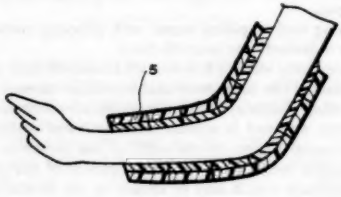
Claude Guignard, Le Vezely/Serby Gare, Saint-Genis-Pouilly, France; Tony Giglio, 15, route des Pilotis, 1246 Corsier-Port, and Abdelkader Benmiloud, 55, avenue de Vaudagne, 1217 Meyrin, both of Switzerland

Filed May 14, 1985, Ser. No. 734,314

Claims priority, application Switzerland, May 14, 1984, 2368/84

Int. Cl.[4] B32B *3/20;* A61F *5/04;* B29C *1/02*

U.S. Cl. 128—90 **15 Claims**



1. A Thermoformable element comprising two adjacent

layers of polymers one of which at least comprises elastically compressible foam, and at least one layer is made of a thermoplastic polymer, which two layers are united at the edges of the layers so as to define between the layers an enclosed space, and in which at least two openings are provided for connecting the said space to the exterior of the elements, one of which openings comprises an inlet for a fluid for heating the said thermoplastic polymer to its thermoforming temperature and the other of which openings comprises an outlet for this fluid.

4,685,454

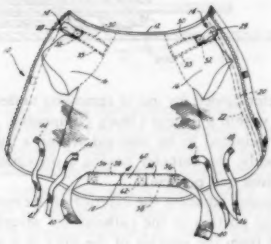
SLEEVED JACKET RESTRAINING DEVICE

John T. Posey, Altadena, Calif., assignor to J. T. Posey Company, Arcadia, Calif.

Continuation of Ser. No. 837,551, Feb. 27, 1986, abandoned, which is a continuation of Ser. No. 743,863, Jun. 10, 1985, abandoned, which is a continuation of Ser. No. 533,053, Sep. 16, 1983, abandoned. This application Sep. 11, 1986, Ser. No. 908,862

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—134 **8 Claims**



1. A restraining device for comfortably holding a patient in a hospital bed or wheelchair, the restraining device comprising:

a jacket disposed around the upper torso of the patient so that it makes a snug fit around the shoulders of the patient and extends downwardly around the midriff of the patient, the jacket having sleeves for extending along the arms of the patient to provide means of restraint for the patient;

a pair of right side ties spaced apart circumferentially from one another on the right side of the midriff region of the jacket, and a pair of left side ties spaced apart circumferentially from one another on the left side of the midriff region of the jacker, each pair of spaced apart ties having inner ends securely affixed to the jacket midriff region and free ends spaced from the jacket so the ties on each side of the jacket can be fastened to one another for adjusting the circumferential size of the jacket midriff region to fit the size of the patient and for retaining the adjusted size of the jacket; and

fastening means securely affixed to the front of the midriff region of the jacket and extending away from opposite sides of the jacket for attachment to a fixture located remotely from the jacket worn by the patient.

4,685,455

WATERVAPOR-PERMEABLE, PRESSURE SENSITIVE, ANTISEPTIC WOUND COVERING MATERIAL

Cornelius M. F. Vrouenraets, Dieren, Netherlands, assignor to Akzo nv, Arnhem, Netherlands

Filed Oct. 11, 1985, Ser. No. 786,484

Claims priority, application Netherlands, Oct. 16, 1984, 8403151

Int. Cl.[4] A61L *15/06*

U.S. Cl. 128—156 **7 Claims**

1. Pressure sensitive, antiseptic wound covering material impermeable to bacteria and viruses, but permeable to watervapour, comprising a substrate of a synthetic polymer and a pressure sensitive adhesive layer on at least the part of the substrate to be stuck to the skin, in which adhesive layer there is incorporated as adhesive a hydrophilic groups-containing acrylate ester copolymer and/or a mixture of polyvinyl methyl ethers and/or polyvinylethyl ethers, characterized in that the substrate and the adhesive layer together have a water vapour permeability of at least 400 $g/m^2/24$ hours in accordance with ASTM/E96-66 [Procedure B; measured at 30° C. and ΔRH of 50%], the substrate is a film of a copolyetherester consisting of a multiplicity of repeating intralinear long-chain and short-chain ester units which are randomly joined head to tail through ester linkages, which long-chain ester units correspond to the formula

and which short-chain ester units correspond to the formula

where G represents a divalent radical which remains after the removal of terminal hydroxyl groups from at least one long-chain glycol having a molecular weight of 800 to 6000 and an atomic ratio of carbon to oxygen of 2,0 to 4,3, R represents a divalent radical remaining after removal of carboxyl groups from at least one carboxylic acid having a molecular weight less than 300, and D represents a divalent radical remaining after removal of hydroxyl groups from at least one diol having a molecular weight less than 250, and at least 80 mole % of the dicarboxylic acid used are terephthalic acid or the ester forming equivalents thereof and at least 80 mole % of the low-molecular weight diol 1,4-butane diol or the ester forming equivalents thereof, with the sum of the mole percentages of the dicarboxylic acid which is not terephthalic acid or the ester forming equivalents thereof and of the low-molecular weight diol which is not 1,4-butanediol or the ester forming equivalent thereof not exceeding 20, and the short-chain ester units form 40–85% by weight of the copolyetherester, at least 15% by weight and not more than 40% by weight of the copolyetherester is formed by long-chain ester units in which the long-chain glycol has a carbon to oxygen ratio of 2,0 to 2,4, and the copolyether ester film contains 1 to 15% by weight of iodine or 0,1 to 8% by weight of 1,6-bis(4-chlorophenyl-diguanido)hexane (i.e. chlorhexidine), calculated on the weight of the copolyetherester.

4,685,456

SELF-RETRACTING OXYGEN TUBING

Mary Smart, 404 Termino Ave., Long Beach, Calif. 90814

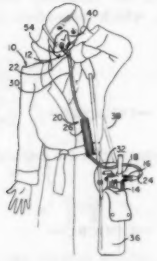
Filed Dec. 2, 1985, Ser. No. 803,320

Int. Cl.[4] A62B *7/00*

U.S. Cl. 128—205.22 **1 Claim**

1. A method of maintaining a supply of oxygen to a patient through a facial respirator from an oxygen reservoir while said patient and said oxygen reservoir are both in motion and are moveable relative to each other comprising: coupling said respirator to said oxygen reservoir through a conduit constructed of a length of flexible, resilient hollow medical grade tubing having opposite ends and a central section permanently formed into a multiplicity of helical coils which are resiliently contracted together in serial contact with each other in the absence of longitudinal tension on said opposite ends, applying longitudinal tension upon said opposite ends of said conduit by moving said respirator and said oxygen reservoir apart relative to each other to thereby resiliently draw said coils apart into spatial separation from each other without stretching said tubing and without exerting tension on said reservoir and said

respirator, and releasing said tension by moving said respirator and said oxygen reservoir toward each other to allow said coils to contract with sufficient spring action to return to serial contact with each other when said longitudinal tension is removed, whereby said conduit accommodates changes in distance between said opposite ends of said tubing and said coils prevent said tubing from slackening when longitudinal tension on said ends is released, and further employing tubing having about a twelve inch uncoiled section at one of said ends and about an eighteen inch uncoiled section at the opposite of



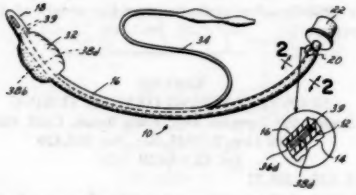
said ends and further comprising connecting said section about twelve inches in length to said respirator and said section about eighteen inches in length to said oxygen reservoir, whereby when the improved oxygen conduit is employed by a user wearing the facial respirator and carrying the oxygen reservoir at approximately waist height, the twelve in length of tubing extends downwardly from the facial respirator to about the chest area of the user and the coiled section prevents the formation of slack loops in the tubing while hanging comfortably against the torso in the chest area of the user so as not to interfere with normal sideways movement of the user's head.

4,685,457

ENDOTRACHEAL TUBE AND METHOD OF INTUBATION

Roger F. Donenfeld, 201 E. 19th St., Apt. 4L, New York, N.Y. 10003

Filed Aug. 29, 1986, Ser. No. 902,302
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—207.14 **6 Claims**



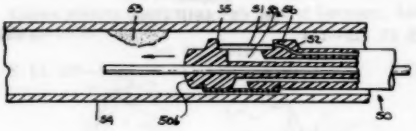
1. An endotracheal tube for respirating a patient comprising:
an elongated, flexible air tube having a deflectable proximal end adapted to be located external to the patient and a deflectable distal end adapted to be located within the trachea of the patient, said air tube being formed with an inner wall and an outer wall spaced from said inner wall;
a plurality of circumferentially spaced passageways formed in said air tube between said inner wall and said outer wall, said passageways extending substantially parallel to one another and longitudinally between said distal end and said proximal end of said air tube;
a control line disposed within each of said passageways, each of said control lines being fixedly mounted at one end to said distal end of said air tube and fixedly mounted at the other end to said proximal end of said air tube, said control lines being movable within said passageways between said distal and proximal ends of said air tube;
said proximal end of said air tube being deflectable in a direction which selectively tensions at least one of said control lines to thereby deflect said distal end of said air tube.

4,685,458

ANGIOPLASTY CATHETER AND METHOD FOR USE THEREOF

Michael E. Leckrone, Indianapolis, Ind., assignor to Vaser, Inc., Indianapolis, Ind.

Division of Ser. No. 585,112, Mar. 1, 1984, Pat. No. 4,627,436.
This application May 31, 1985, Ser. No. 739,986
Int. Cl.[4] A61B *17/38*
U.S. Cl. 128—303.1 **14 Claims**



1. A catheter device for use in removing undesired material from a duct within a patient's body comprising:
a catheter adapted to be inserted within a duct in the patient's body, the catheter having a proximal end portion and a distal end portion,
means disposed adjacent the exterior of the catheter and the distal end portion of the catheter for severing undesired material from the interior of the duct in a patient's body when the distal end portion of the catheter is disposed adjacent to the undesired material, the severing means including an element adapted to be heated, and means for heating the element, the element when heated being adapted to sever the undesired material from the interior of the duct,
an inflatable bladder mounted on the catheter adjacent the distal end portion thereof disposed substantially opposite the severing means, and
means for controllably inflating the bladder when the device is disposed in the duct to enable the inflated bladder to contact the inner surface of the duct and urge the distal end portion of the catheter against the inner surface of the duct adjacent thereto,
whereby the means for severing undesired material is positioned adjacent to the inner surface of the duct.

4,685,459

DEVICE FOR BIPOLAR HIGH-FREQUENCY COAGULATION OF BIOLOGICAL TISSUE

Rainer Koch, and Rüdiger Stockert, both of Freiburg, Fed. Rep. of Germany, assignors to Fischer MET GmbH, Freiburg, Fed. Rep. of Germany

Filed Mar. 6, 1986, Ser. No. 836,968
Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 3511107
Int. Cl.[4] A61B *17/39*
U.S. Cl. 128—303.17 **23 Claims**

1. A device for bipolar high-frequency coagulation of biological tissue comprising:
a coagulating pincer with a first shank defining a first contact face and a second shank defining a second contact face;
a controllable high-frequency generator;
said first shank contact fee and said second shank contact face electrically connected to said generator;
a pair of temperature sensors, one of said sensors located

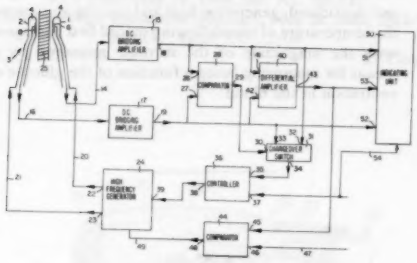
near said first shank contact face and the other of said sensors located near said shank contact face;

evaluation means having a controller for controlling said high-frequency generator with a first selectively preset input representing a predetermined coagulation temperature and a second input;

a first comparator connected to said temperature sensors, and having an output; and

changeover switch means having a first input connected to said output of said first comparator, a second input connected to one of said temperature sensors, a third input connected to the other of said temperature sensors, and an output connected to said second input of said controller, whereby said changeover switch means electrically connects the temperature sensor representing the highest temperature to said second input of said controller;

said evaluation means connected to said temperature sensors for evaluating the temperatures near said first and second contact faces and controlling said high-frequency generator in response to said highest temperature.

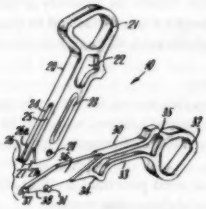


4,685,460

SKIN CLIP REMOVER

Curtis W. Thornton, Raleigh, N.C., assignor to Edward Weck & Company, Inc., Research Triangle Park, N.C.

Filed Aug. 10, 1981, Ser. No. 291,534
Int. Cl.[4] A61B *17/10*
U.S. Cl. 128—321 **2 Claims**



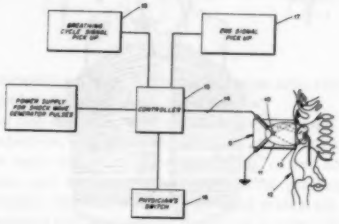
2. In a hand operated skin clip remover having two elements joined together by a pivot at a point intermediate their ends with one element split at its distal end to form two parallel anvil feet and the other element having a single member at its distal end sized to fit between said anvil feet when the proximal ends of two elements are brought toward each other to provide a hand operated tool capable of gripping an object between opposing faces of the distal ends of said two elements, the improvement which comprises providing the pivot in a form permitting lateral outward movement at the pivot of two sides of the split distal end of the one element.

4,685,461

APPARATUS AND METHOD FOR TRIGGERING SHOCK WAVES IN LITHOTRIPSY

Bernd Forssmann, Friedrichshafen; Wolfgang Hepp, Immenstaad; Klaus Ackern, Gauting, and Christian Chaussy, Germering, all of Fed. Rep. of Germany, assignors to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany

Continuation of Ser. No. 722,126, Apr. 10, 1985, abandoned, which is a continuation of Ser. No. 443,567, Nov. 22, 1982, abandoned. This application Aug. 11, 1986, Ser. No. 894,739
Claims priority, application Fed. Rep. of Germany, Nov. 25, 1981, 31466281
Int. Cl.[4] A61B *17/27*
U.S. Cl. 128—328 **8 Claims**



1. In an apparatus for comminuting a concretion located at a place within the body of a patient remote from the patient's heart, such as within a kidney, by focusing shock waves from a shock wave generator means located outside the patient's body so that such waves pass through body tissue to the concretion to comminute such concretion, said apparatus including means for passing pulses of energy to said generator means for generating shock waves, an improved shock wave triggering system for use during the treatment of patients who might be subject to extrasystole stimulation, said triggering system comprising

EKG signal pick up means adapted to respond to the patient's heartbeat cycle,

means operatively connected to said EKG signal pick up means and to said means for passing pulses of energy to said generator means for enabling generation of a shock wave only during a safe zone in the S-T interval of the patient's heartbeat cycle, and

manually operable physician's switch means operatively connected to said means for passing pulses of energy to said generator means for preventing the passage of a pulse to said generator means except when the physician has activated said switch means, so that a shock wave can be generated only at a time when both the physician's switch means has been activated and said safe zone has been reached in the heartbeat cycle.

4,685,462

METHOD AND APPARATUS FOR TREATMENT OF HYPOTHERMIA BY ELECTROMAGNETIC ENERGY

Richard G. Olsen, Pensacola, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 21, 1985, Ser. No. 768,072
Int. Cl.[4] A61N *1/04*
U.S. Cl. 128—422 **2 Claims**

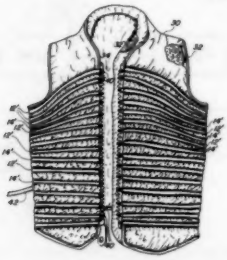
1. Apparatus for rewarming a human subject from a state of severe hypothermia, said apparatus comprising:

a helical first coil comprising a flexible electrical conductor formed into a plurality of turns, in the range of about 4 to 16 turns, so as to define a lumen for receiving the torso of said subject from about the waist to about the upper chest thereof so as to cover a zone including the heart of said subject, said first coil being electrically open-ended;

a helical second coil comprising a flexible electrical conduc-

tor formed into at least one turn interleaved with turns of said first coil so that said first and second coils are mutually inductively coupled;

support means comprising a flexible fabric jacket to which said coils are secured comprising flexible insulation and spacing material for maintaining a minimum predetermined spacing between said coils and said subject, said jacket having an opening at which said coil turns are interrupted to facilitate donning and zipper means comprising mating conductive teeth for electrically connecting interrupted portions of said turns when said zipper means is closed and non-conductive teeth disposed between said turns;



said first and second coils being cooperable with said subject to form an alternating current resonant circuit having a characteristic resonant frequency in the range of about 2 MHz to about 20 MHz;

an alternating current source comprising a radio frequency generator for generating alternating current at said characteristic resonant frequency;

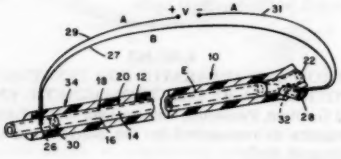
means connecting said alternating current source to said second coil for energizing thereof with said alternating current and inductively energizing said first coil at said resonant frequency whereby said subject is warmed throughout said zone.

4,685,463

DEVICE FOR CONTINUOUS IN VIVO MEASUREMENT OF BLOOD GLUCOSE CONCENTRATIONS

R. Bruce Williams, One Stonehaven Dr., Signal Mountain, Tenn. 37377

Filed Apr. 3, 1986, Ser. No. 847,479
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—632 **12 Claims**



1. A device for continuous in vivo measurement of blood glucose concentration, comprising:

at least one elongate, double passageway having a first passageway adapted to be in flow communication with one or more small arteries to receive and conduct a flow of blood and to deliver the flow of blood back to one or more veins, and having a second passageway adjacent said first passageway;

a semi-permeable membrane wall located within said double passageway to separate said first passageway from said second passageway, said membrane wall being permeable to permit diffusion therethrough of glucose;

a quantity of enzyme located within said second passageway for catalyzing the oxidation of glucose diffusing into said second passageway to generate heat;

means for insulating said double passageway to substantially eliminate radial heat transfer out of said double passageway; and

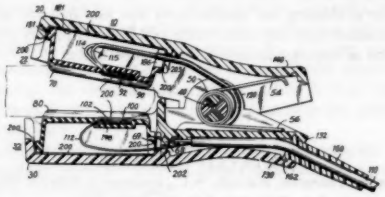
means for measuring the increase in temperature of blood passing through said first passageway, whereby glucose within the blood flowing in said first passageway diffuses through said membrane wall into said second passageway and is oxidized, generating heat and causing an increase in the temperature of blood flowing in said first passageway, with the magnitude of the increase measured by said means for measuring being a function of the glucose concentration in the blood.

4,685,464

DURABLE SENSOR FOR DETECTING OPTICAL PULSES

Daniel S. Goldberger, San Fransisco; James E. Corenman, Menlo Park, and Kenneth R. McCord, Belmont, all of Calif., assignors to Nellcor Incorporated, Hayward, Calif.

Filed Jul. 5, 1985, Ser. No. 752,404
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—633 **24 Claims**



1. A sensor for use in illuminating a patient's tissue to measure blood constituents, comprising:

a first housing;

a first deformable means for securely gripping and complying to the patient's tissue, attached to the first housing and having an undeformed shape when not complying to the tissue;

a second housing;

a second deformable means for securely gripping and complying to the patient's tissue, attached to the second housing and having an undeformed shape when not complying to the tissue;

a light source secured proximal to the surface of one of the first or second deformable means;

a light detector secured proximal to the surface of the other of the first or second deformable means;

means for arranging the first and second housings so that the first and second deformable means are in opposition about the patient's tissue; and

means for connecting the first and second housings together about the patient's tissue so that the first and second deformable means grip and conform to the shape of the tissue without substantially altering the blood flow and for disengaging the sensor from the tissue to permit the first and second deformable means to return to their undeformed shape.

4,685,465

ELECTRODE DEVICE FOR TRANSCUTANEOUSLY MEASURING A BLOOD GAS PARAMETER AND FOR SENSING A BIOELECTRICAL SIGNAL AND AN ELECTRODE ASSEMBLY COMPRISING SUCH AN ELECTRODE DEVICE

Peter C. Klitgaard, Virum, and Knud G. Pedersen, Lyngby, both of Denmark, assignors to Radiometer A/S, Copenhagen NV, Denmark

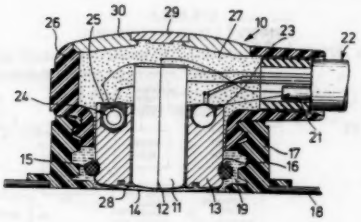
PCT No. PCT/DK84/00048, § 371 Date Jan. 24, 1985, § 102(e) Date Jan. 24, 1985, PCT Pub. No. WO84/04815, PCT Pub. Date Dec. 6, 1984

PCT Filed May 24, 1984, Ser. No. 709,027

Claims priority, application Denmark, May 24, 1983, 2301/83

Int. Cl.[4] A61B 5/00, 5/04

U.S. Cl. 128—635 21 Claims



1. An electrode device to be arranged at a skin surface part of a test person or a test object for transcutaneously measuring a blood gas parameter and for sensing a bioelectrical signal of said test person or test object, comprising:

(a) a housing;

(b) an electrochemical measuring electrode system for measuring said blood gas parameter and comprising:

(i) at least two electrochemical electrodes for generating at least one measuring signal, said electrochemical electrodes being arranged in said housing electrically insulated in relation to one another, and

(ii) an electrolyte;

(c) a membrane permeable to said blood gas and to be arranged adjacent to said skin surface part so as to allow diffusion of said blood gas from said skin surface part through said membrane, said membrane being arranged in relation to said electrochemical electrodes so as to define an electrolyte chamber in front of said electrochemical electrodes, in which chamber said electrolyte is confined electrolytically communicating with said electrochemical electrodes;

(d) an electrode for sensing said bioelectrical signal; and

(e) means for transmitting said measuring signal and for transmitting said bioelectrical signal,

said bioelectrical signal sensing electrode being constituted by one of said electrochemical electrodes of said electrochemical electrode system, said membrane further being arranged in relation to said electrochemical electrodes so as to separate said one electrode into a first part and a second part, said first part being covered by said membrane, and said second part being uncovered by said membrane so as to electrically conductively communicate with said skin surface part when said membrane is arranged adjacent thereto.

4,685,466

MEASURING SENSOR FOR THE NON-INVASIVE DETECTION OF ELECTRO-PHYSIOLOGICAL QUANTITIES

Günter Rau, Mauerkircherstrasse 45, 8000 München, Fed. Rep. of Germany (80)

Filed Jan. 28, 1986, Ser. No. 823,351

Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, 3502913

Int. Cl.[4] A61B 5/04

U.S. Cl. 128—639 8 Claims

1. A measuring sensor for the noninvasive detection of electro-physiological quantities, comprising:

at least one electrode with a fine needle-like point for local conduction, said electrode being covered with an insulation layer except at an outermost tip of the needle-like point, and said needle-tip point being produced from electrode material and being covered with a salt layer;

an insulating plastic sheet-like mounting in which the at least one electrode is mounted with the needle-like point extending therefrom, the outermost tip of the needle-like point being positioned at a predetermined distance from the mounting so as to limit penetration of the at least one electrode to uppermost horny cell layers of a patient's skin; and

a miniaturized active preamplifier connected directly to the at least one electrode;

wherein the at least one electrode is fastenable to a skin surface of a patient by means of the sheet-like mounting such that, during measurement, penetration of the at least one electrode into the skin surface is limited to the predetermined distance so that only the uppermost horny cell layers of the skin are pierced.

4,685,467

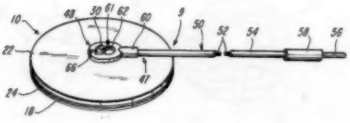
X-RAY TRANSPARENT MEDICAL ELECTRODES AND LEAD WIRES AND ASSEMBLIES THEREOF

James V. Cartmell; Michael J. Allaire; Larry R. Burcham, and Charles T. Patrick, Jr., all of Dayton, Ohio, assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Jul. 10, 1985, Ser. No. 753,411

Int. Cl.[4] A61B 5/04

U.S. Cl. 128—640 29 Claims



1. In an x-ray transparent medical electrode assembly of the type comprising a conductor, means for bridging the conductor to human tissue, and connector means detachably connected to said conductor for connecting said conductor to peripheral equipment, the improvement wherein said conductor comprises a conductive plastic body that includes a stud having a thin metal coating on its outer surface, wherein said connector means comprises a conductive plastic body having an opening extending therethrough for receiving said stud, and wherein said body has surface portions defining marginal portions of said openings that resiliently grip said outer surface of

said stud when said connector means is connected to said conductor.

4,685,468

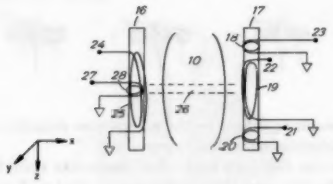
NMR IMAGING SYSTEM USING FIELD COMPENSATION

Albert Macovski, 2505 Alpine Way, Menlo Park, Calif. 29025

Filed Mar. 18, 1983, Ser. No. 476,474

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—653 **23 Claims**



7. Apparatus for NMR imaging of an object in the presence of temporarily unstable magnetic fields comprising:

means for exciting the volume of the object using a broadband excitation signal;

a pickup coil having a core positioned external to the object which receives signals from a planar section which intersects the object;

means for receiving a reference signal from the pickup coil and processing it to drive a second excitation signal representing a particular planar section whose frequency is based on the frequency of the reference signal;

means for receiving imaging signals resulting from the second excitation; and

means for utilizing the imaging signals for producing an NMR image of the object.

4,685,469

PIEZORESISTIVE PRESSURE MEASURING CELL

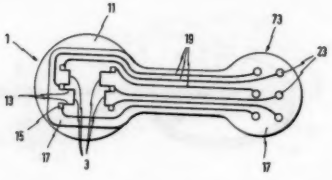
Hans W. Keller, Burgstrasse 142, CH-8404 Winterthur, Switzerland

Filed Feb. 14, 1985, Ser. No. 701,786

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1984, 8407322[U]

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—675 **24 Claims**



1. In a piezoresistive pressure measuring cell having a measuring membrane provided with resistance elements having electrical contact points thereon, and with conductors extending from the electrical contact points of the measuring membrane, said pressure measuring cell being characterized in that:

said conductors are disposed on a flexible plastic film and have opposed first and second ends;

the first of said conductor ends have a plurality of contact protuberances disposed thereon;

said conductors are electrically coupled to said resistance element contact points through said contact protuberances;

said second conductor ends are provided with solderable contact eyes; and

said film is provided with a central hole in the region of each contact eye, at least one surface of said contact eye being exposed whereby the end portion of an interconnecting wire may be received within said central hole.

4,685,470

CARDIAC OUTPUT MEASUREMENT SYSTEM AND METHOD

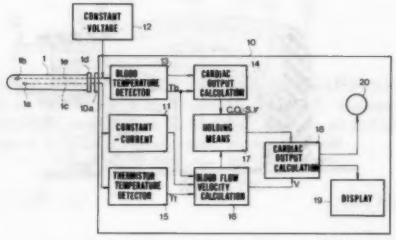
Shigehazu Sekii, and Susumu Tanabe, both of Fujinomiya, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 18, 1985, Ser. No. 799,001

Claims priority, application Japan, Nov. 21, 1984, 59-244586

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—692 **10 Claims**



1. A cardiac output measurement apparatus, comprising:

cardiac output obtaining means for obtaining cardiac output by a thermal attenuation method;

blood flow velocity means for obtaining blood flow velocity by a thermal-type flowrate measurement;

means for obtaining a constituent value functionally related to the cardiac output and blood flow velocity obtained by said cardiac output obtaining means and said blood flow velocity means;

storing means for holding the constituent value obtained;

means for starting said blood flow velocity means during continuous measurement instants;

means for updating said constituent value including means for initiating said cardiac output obtaining means to measure a new cardiac output; and

calculating means for calculating cardiac output from the constituent value held in said storing means and as updated by said updating means, and a newly obtained blood flow velocity each time said blood flow velocity means is started.

4,685,471

METHOD AND APPARATUS FOR PREDICTING AND DETECTING THE ONSET OF OVULATION

Jennine Regas, Denver, and Ranjit S. Fernando, Aurora, both of Colo., assignors to Zetek, Inc., Aurora, Colo.

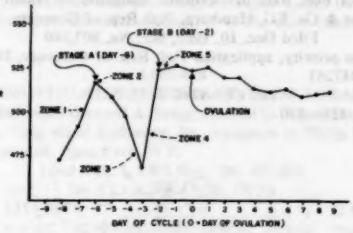
Continuation-in-part of Ser. No. 649,844, Sep. 11, 1984, abandoned. This application Mar. 20, 1985, Ser. No. 713,866

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—734 **27 Claims**

1. A method for predicting ovulation in a human female subject, comprising the steps of noting the onset of menstruation of the subject, making daily determinations of the electrical resistivity of the subject's saliva beginning not more than five days following beginning of menstruation, and indicating

the onset of ovulation as a function of a peak resistivity measurement following onset of menstruation, which peak is followed by a nadir and subsequent sharp increase in said electrical resistivity measurement.



4,685,472

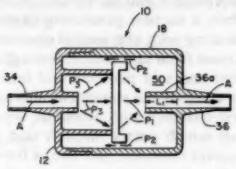
SPECIMEN COLLECTOR

Rudolph Muto, 24 William St., Andover, Mass. 01810, assignor to Rudolph Muto, Lawrence, Mass.

Filed Jan. 23, 1984, Ser. No. 573,058

Int. Cl.[4] A61B *10/00*

U.S. Cl. 128—760 **10 Claims**



1. A specimen collector comprising:

a first liquid chamber comprising a first cylindrical liquid-impervious wall having an axis and two axial ends, a liquid-impervious end wall closing one axial end of the first chamber, and a filtration means attached transversely across the other axial end of the first chamber;

an inlet conduit sealed to and leading axially into said first chamber from the end wall toward and terminating axially spaced from the filtration means, said conduit being spaced radially from the cylindrical side wall;

a second liquid chamber comprising an outer cylindrical liquid-impervious wall of greater diameter than and coaxial with that of the first chamber cylindrical wall and having two axial ends, and a liquid-impervious end wall, at one axial end, the outer cylindrical wall liquid-imperviously joined to the one end wall of the first chamber, and a liquid-impervious end wall at the other axial end of the second chamber;

there being an annular space surrounding the first cylindrical wall and the outer wall, the second chamber including and communicating with the annular space; and

an outlet conduit sealed to and leading through and extending axially into the second chamber from the second chamber end wall toward and axially spaced from the filtration means, the outlet conduit extension being radially spaced from the outer wall to form with the outer wall and the second chamber's end wall an annular cup;

whereby regardless of orientation during filtering of liquid from inlet to outlet conduits, the second chamber collects liquid and tends to inhibit back flow through the filtration means by retaining liquid in one of: the annular cup, the annular space, and along the outer wall; and whereby the annular cup may retain liquid filtrate when in upright orientation.

4,685,473

ORIENTABLE CARDIOVASCULAR SOUND

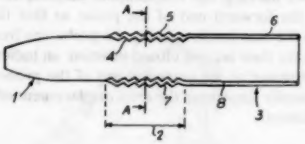
Gilles Karcher, Nancy; Max Amor, Vandoeuvre; Roger Niddam, Le Rancy, and Jean-Pierre Villemot, Nancy, all of France, assignors to Medicorp Research Laboratories Corporation, Boca Raton, Fla.

Filed Feb. 21, 1986, Ser. No. 832,247

Claims priority, application France, Feb. 22, 1985, 85 02568

Int. Cl.[4] A61B *5/00*

U.S. Cl. 128—772 **6 Claims**



1. An orientable, endovascular sound, comprising: a sound body; a sound head; and articulation means disposed between the sound head and the sound body, said means including at least one bellows for being inflated by a fluid to produce orientation of the head in a radial direction opposite the inflated belows, said articulation means being part of a continuous wall extending along said sound head and sound body.

4,685,474

DEVICE FOR THE DETERMINATION OF THE INNER DIMENSIONS OF HOLLOW ORGANS

Karl H. Kurz, Rheinbabenstr. 5, D-4000 Dusseldorf, and Andres Schilling, Fohrenstr. 47, D-7200 Tuttlingen, all of Fed. Rep. of Germany

Filed Aug. 24, 1984, Ser. No. 644,070

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1983, 3330921

Int. Cl.[4] A61B *5/10*

U.S. Cl. 128—778 **18 Claims**

1. A device for the determination of the inner dimensions of a hollow organ being comprised of: a hollow, tube like probe having a forward end and a rearward end; a rod-like translational element having a forward end and a rearward end, said element being slidably disposed in the probe for coaxial movement therein; a biasing means for constantly urging the translational element in a direction towards the rearward end of the

probe; a pin disposed on the forward end of the translational element for axial movement therewith; a pair of diverging probe tips, each of said probe tips being pivotably mounted about a pivot point at the forward end of the probe for movement between a first closed position and a second open position in a vertical plane about the longitudinal axis of the probe, each of said probe tips further having a cam track formed therein, rearwardly of the pivot point, each of said cam tracks being oriented at an angle with respect to the longitudinal axis of the probe tips to simultaneously receive the pin therein, whereby movement of the pin in the cam tracks pivot the probe tips between their first and second positions; means for exerting controlled axial pressure on the rearward end of the translational element for overcoming the pressure of the biasing means and moving the translational element in a direction towards the forward end of the probe so that the pin is received in the cam tracks moving the probe tips from their first position into their second closed position; an indicating device being positioned at the rearward end of the probe responding to and visually displaying the axial displacement of the translational element.

4,685,475

MONITORING ROD

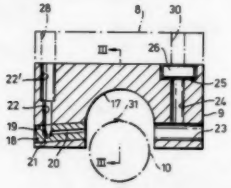
Keith D. Ridler, Manchester; Peter J. Taylor; John Poley, both of Royston; Christopher W. Norvall, Southampton, and John Upton, Cambridge, all of United Kingdom, assignors to British-American Tobacco Company Limited, London, England

Filed Nov. 29, 1984, Ser. No. 676,173

Claims priority, application United Kingdom, Dec. 10, 1983, 8333050

Int. Cl.[4] A24C *5/32*

U.S. Cl. 131—84.1 **7 Claims**



1. Rod monitoring apparatus for monitoring for defects in a longitudinal lap seam of a wrapper of a moving cigarette rod, said apparatus comprising nozzle means locatable adjacent a travel path of cigarette rod and operable when located to direct a stream of gaseous medium transversely of said path towards the periphery of cigarette rod travelling in said path, duct means locatable so that an inlet end thereof can receive gaseous medium of a stream thereof emanating from said nozzle means after the stream has flowed in Coanda effect contact with the periphery of said rod, and a microphone in communication with said duct means, wherein defects in the longitudinal lap seam of the wrapping of said rod are detected by differences in the acoustic noise pattern of said medium at said microphone.

4,685,476

APPARATUS FOR SUPPLYING PARTICLES OF TOBACCO TO PROCESSING MACHINES

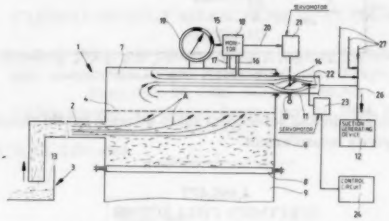
Fritz Hagemann, Hamburg, and Klaus Hagenah, Geesthacht, both of Fed. Rep. of Germany, assignors to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

Filed Dec. 10, 1985, Ser. No. 807,360

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1984, 3447261

Int. Cl.[4] A24C *5/18, 5/39*

U.S. Cl. 131—110 **8 Claims**



1. Apparatus for conveying a flowable particulate material, particularly fragments of tobacco leaves, comprising a source of particulate material; an air separator having first and second chambers and including an air-permeable partition between said chambers; an pneumatic conveyor having an inlet communicating with said source and an outlet communicating with said first chamber; a suction generating device having inlet means communicating with said second chamber to induce the flow of an air stream from said source, through said conveyor, said first chamber and said partition and into and from said second chamber whereby the stream entrains particulate material into said first chamber with attendant separation of such material from air which passes through said partition on its way into said second chamber; and means for monitoring the velocity of the air stream in said conveyor, including means for comparing the pressure of air in said second chamber with the pressure of air in said inlet means.

4,685,477

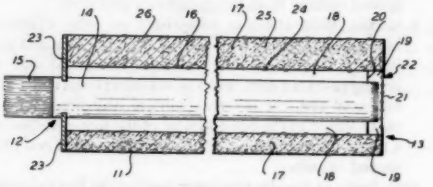
CIGAR OR CIGARETTE HOLDER

Loredana G. Valdez, 15 Hillcrest Rd., Caldwell, N.J. 07006

Filed Dec. 18, 1985, Ser. No. 810,359

Int. Cl.[4] A24F *13/02, 13/22*

U.S. Cl. 131—175 **3 Claims**



1. A cigar or cigarette holder capable of receiving a cigar or cigarette with the lighted end contained in said holder and for filtering the smoke generated within said holder, said holder comprising three chambers, the first chamber defined by the space between a tubular member, concentrically situated around an inner tubular member, and the inner tubular member, each tubular member consisting of a wall comprising a plurality of perforations along its length, said first chamber being substantially filled with a filter means, the interior of the inner tubular member defining the second chamber for receiving the cigar or cigarette and retaining the ash therefrom, the third chamber being substantially coaxially aligned with the second chamber and being within the inner tubular member,

said third chamber defined by an annular wall, a portion of the inner tubular member and an end plate having air intake means, said annular wall being at one end of the second chamber and having means to receive the ember end of the cigar or cigarette, said annular wall further cooperating with the inner tubular member, thereby providing a transfer means for transferring ash from the second chamber to the third chamber.

4,685,478

THERMOPHILIC DENITRIFICATION OF TOBACCO

Vedpal S. Malik; Bernard A. Semp; Hernan G. Bravo, and Daniel M. Teng, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Oct. 1, 1981, Ser. No. 307,602
Int. Cl.[4] A24B *15/20, 15/24*
U.S. Cl. 131—297 **12 Claims**

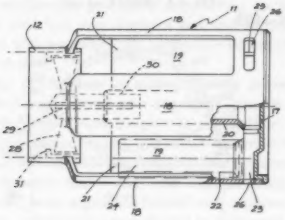
1. A process for the denitrification of tobacco materials, comprising the step of contacting said tobacco materials, which have not been terminally sterilized, with at least one thermophilic organism characterized by an anaerobic, dissimilatory, metabolic pathway for denitrification of tobacco materials under anaerobic and high temperature conditions, of above about 45° C., that promote such metabolism, wherein said temperature is maintained without cooling.

4,685,479

HEATING HAIR ROLLERS

John W. McClean, Sydney N.S.W., Australia, assignor to Breville R & D Pty. Ltd., Pyrmont, Australia

Filed Jul. 3, 1985, Ser. No. 751,493
Claims priority, application Australia, Jul. 13, 1984, PG5997; Nov. 28, 1984, PG8327
Int. Cl.[4] A45D *2/36*
U.S. Cl. 132—36 R **3 Claims**



1. A heater for hair curling rollers comprising an attachment for an electric hair dryer, the attachment comprising an air entry section adapted to be engaged about the air outlet of an electric hair dryer and an air outlet section adapted to receive and support a plurality of hair curler rollers and means to direct heated air from the hair dryer and cause it to enter the interior of each roller and pass around the roller thereby heating the roller wherein there is provided in the air entry section a fan arranged to distribute heated air from the hair dryer evenly to the hair rollers, wherein the air entry section consists of a ring for engaging the end of a barrel of an electric hair dryer and wherein the outlet section comprises a bottom for supporting a plurality of hair rollers in an axially parallel relationship.

4,685,480

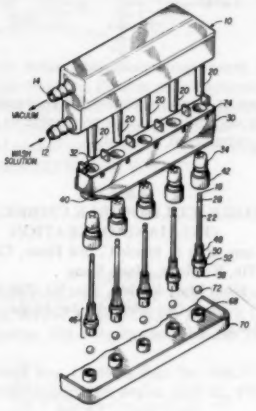
COMBINED WASHER AND ASPIRATOR

Paul L. Eck, Deerfield, Ill., assignor to Abbott Laboratories, Abbott Park, Ill.

Filed Aug. 30, 1985, Ser. No. 771,395
Int. Cl.[4] B08B *3/02*
U.S. Cl. 134—182 **5 Claims**

1. In a combined washer and aspirator device for washing beads in reaction wells of an immunoassay reaction tray, said device comprising a manifold assembly having two independent parallel fluid passages, one parallel fluid passage being connected to a pressurized wash solution source on one end and to a multiplicity of outer concentric fluid passages on the other end, and the other parallel fluid passage being connected to a vacuum source on one end and to a multiplicity of inner concentric fluid passages on the other end, the outer and inner concentric fluid passages being formed by a multiplicity of outer tubular members connected to the lower portion of the manifold assembly and easily insertable and removable inner tubular members held by O-rings in compartments between the two independent parallel fluid passages; the improvement wherein said device further comprises:

(a) a frame fitting over said outer tubular members and connected to a lower portion of said manifold assembly, said frame having a multiplicity of openings therethrough;



(b) reaction well seals housed within a lower portion of said openings in said frame, said reaction well seals contacting said reaction tray and sealing around said reaction wells; and

(c) tips attached to a lower portion of said inner tubular members, said tips having a skirt portion, an upper portion of said tips mating with a lower portion of said outer tubular members to form flow-balancing channels, and the skirt portion of said tips mating with said reaction well seals to form spiral channels;

wherein when wash solution passes through the multiplicity of outer concentric fluid passages into the flow-balancing channels, the fluid is evenly distributed among the spiral channels into the reaction wells.

4,685,481

WASHER FOR PLANT ROOTS AND OTHER ARTICLES

Steven J. Carlson; William W. Donald, and James J. Lepine, all of Fargo, N. Dak., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

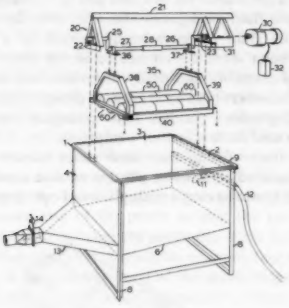
Filed Feb. 3, 1986, Ser. No. 825,004
Int. Cl.[4] B08B *3/06*
U.S. Cl. 134—155 **5 Claims**

1. A washing apparatus for separating a coarse component from a relatively fine, contaminant material in a sample comprising;

(a) a tank for holding a liquid solvent, said tank having an upper perimeter;

(b) a rotatable shaft mounted near the upper perimeter of the tank, said shaft having an axis of rotation and a segment which is off-set from said axis of rotation;

(c) a drive means for rotating the shaft;
(d) a cannister support cradle pivotally mounted on the off-set segment of the shaft and adapted for securing one or more cannisters; and



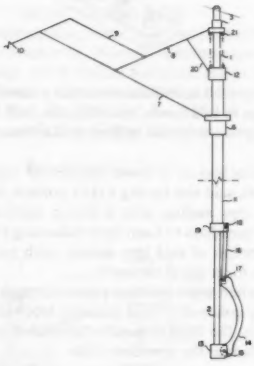
(e) said one or more cannisters for containing said sample, wherein said cannisters are permeable to the solvent and to the contaminant material.

4,685,482

CLOSABLE, COLLAPSIBLE UMBRELLA FOR ONE-HAND OPERATION

Kwong Y. Yung, Flat 6, Block C, 3rd Floor, Chun Man Court, Ho Man Tin, Kowloon, Hong Kong

Filed Mar. 6, 1985, Ser. No. 708,702
Int. Cl.[4] A45B *25/14, 19/04*
U.S. Cl. 135—24 **6 Claims**



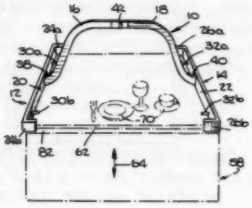
1. An umbrella being operated by one hand, comprising:
a telescopic stem including a large diameter tube (1) at one end of said stem and a smaller diameter tube (2) partly slidable within said large diameter tube (1) and having an end projecting from said large diameter tube (1) to the other end of said stem;
a crown (3) connected to one of said ends of said stem;
a handle (13) secured to the other of said ends of said stem;
a radius handgrip (14) pivoted at one end to said handle (13);
means comprising ribs (10), stretchers (7), links (8) and auxiliary links (9) pivotally interconnected for constituting a frame carried on said stem;
an elongated runner slide (11) slidable on said stem;
a runner (6) slidable along said elongated runner slide (11) and pivotally supporting one end of each of said stretchers (7), said links (8) each being pivoted at one end to said crown (3) and at the other end to said stretchers (7) intermediate the ends of said stretchers (7), each of said auxiliary links (9) being pivoted at one end to one of said links (8) intermediate the ends of said links (8) and at the other end to one end of said ribs (10), the other ends of said stretchers (7) being pivoted to said ribs (10) intermediate the ends of said ribs (10);
a collar (19) at one end of said elongated runner slide (11);
a notch member (12) on the other end of said elongated runner slide (11), said other end of said elongated runner slide being closer to said crown (3) than said collar, whereby said notch member (12) is movable between said crown (3) and said runner (6) from a first position to a second position, said second position being closer to said crown upon the opening of the umbrella;
struts (20) each pivoted at one end to said notch member (12) and at their other end to a selective one of said links (8) and said stretchers (7) intermediate the ends thereof; and
a lever (16) pivotally attached at one end to said collar (19) and at the other end to the other end of said radius handgrip, whereby arcuate movement of the radius handgrip (14) transversely of the axis of said stem actuated by the user permits expanding or collapsing said stem and, by relative axial sliding movement of said elongated runner slide, said runner, and said notch along said stem to displace said struts (20), opening or closing said frame, said sliding movement resulting from a movement of said lever through a perpendicular relative to a longitudinal axis of said stem.

4,685,483

COLLAPSIBLE SUPPORT FOR FOOD SCREEN

Michael A. Balazs, Boca Raton, Fla., assignor to Boca Raton Hotel and Club, Boca Raton, Fla.

Filed Jan. 17, 1986, Ser. No. 820,530
Int. Cl.[4] E04H *15/36*
U.S. Cl. 135—102 **10 Claims**



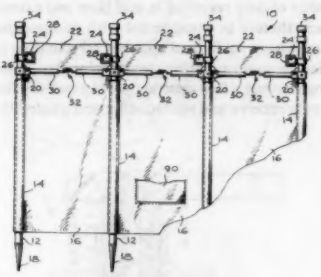
1. A collapsible frame assembly adapted to be disposed in an open configuration on a horizontal surface for holding a cover sheet to protect items resting on said horizontal surface, said frame assembly comprising:
a pair of elongated substantially rigid base members, said base members being adapted to rest on said horizontal surface; and
a pair of substantially rigid support members each of which has two ends, each of said support members including means cooperably connected at a respective end thereof to a respective one of the said base members which permits each support member to rotate with respect to the base member to which it is connected, said support members also including means cooperably interconnecting the other end of each respective rigid support member to each other to permit rotational movement between said support members, whereby said frame is collapsed from the open configuration by rotating the support members in a manner which brings the support members and the base members adjacent one another to form a folded storage configuration and wherein the frame is opened from said folded storage configuration by rotating the support members in an opposite direction.

4,685,484

WIND SHELTER

Ted C. Moneta, 1115 S. Wooster St., #206, Los Angeles, Calif. 90035

Filed Sep. 13, 1985, Ser. No. 775,531
Int. Cl.[4] E04H *15/58, 15/02;* E06B *3/12;* A47G *5/00*
U.S. Cl. 135—117 **3 Claims**



1. An improved wind shelter including

a plurality of posts, said posts having top and bottom portions, said bottom portions being pointed, said top portions having hand grips at the upper extremities thereof;

an arm mechanism interconnecting adjacent posts in said wind shelter, said arm mechanism including first and second arm segments, each of said first and second arm segments having a first and second end;

a toggling mechanism interconnecting said second end of said first arm segment to said first end of said second arm segment;

a strap mechanism pivotably supporting each of said first end of said first arm segment and said second end of said second arm segment from respective adjacent posts in said wind shelter;

said strap mechanism including biasing means for biasing said first and second arm segments into an opposed and aligned position with respect to each other;

said toggling mechanism including means for urging said first and second arm segments into an opposed and aligned position when said shelter is in use and towards a position with said arm segments folded and adjacent along their lengths, when said wind shelter is collapsed for transportation; and,

fabric means, said fabric means including a pocket portion and a flap portion;

said pocket portion including pockets for receiving said posts and extending substantially the full length of each of said posts, said flap portion including retainer means for securing said flap portion to said top portion of each of said posts.

4,685,485

PNEUMATIC DEVICES WITH NOISE DAMPENING

Richard D. Haugen, Arlington Heights, Ill., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 25, 1981, Ser. No. 324,927
Int. Cl.[4] G05D *16/00*
U.S. Cl. 137—85 **13 Claims**

1. A pneumatic device having noise dampening comprising:

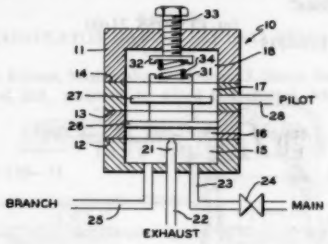
housing means defining at least two chambers, one of said chambers having a nozzle therein;

diaphragm means including a diaphragm separating said at least two chambers;

first connecting means connecting a source of pressure to one of said chambers;

second connecting means connected to one of said chambers for providing an output signal, said output signal having a value dependent upon interaction between said nozzle and said diaphragm; and,

dampening means within one of said chambers and touching said housing means, said dampening means being flexible for permitting movement of said diaphragm to control said output pressure in said second connecting means and



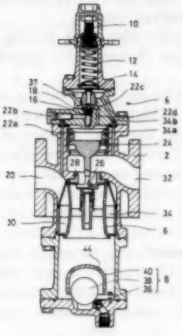
to dampen noise, said dampening means comprising a pusher plate having a flexible outer perimeter, contacting said housing means for permitting movement of said diaphragm to control said output pressure and to dampen noise, said pusher plate having cuts forming flexible arms which touch said housing means.

4,685,486

CONDENSATE SEPARATING AND DISCHARGING DEVICE WITH APERTURED FLOAT COVER

Takeshi Yokoyama, 238 3 Agata-cho, Ono-Shi Hyogo, 675-13, Japan

Filed Sep. 17, 1986, Ser. No. 908,377
Claims priority, application Japan, Sep. 17, 1985, 60-205628
Int. Cl.[4] F16T *1/20*
U.S. Cl. 137—179 **6 Claims**



1. In a condensate separating and discharging device including inlet means, a separator section for directing into a swirling flow pattern gas containing condensate entering through said inlet means, exhaust means for exhausting gas passing through said separator section, a steam trap section provided below said separator section for receiving condensate therefrom, and condensate discharge valve means in said trap section including a float and a domed cover covering said float, the improvement comprising aperture means in said domed cover formed at a position on a circle having a center identical with a center of said domed cover and having a radius obtained by multiplying an outer diameter of said domed cover by a coefficient having a value between 0.2 and 0.36.

4,685,487

SANITARY MIXING VALVE

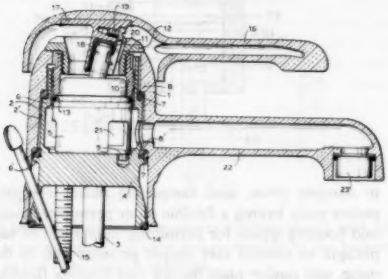
Dieter Derdack, Wittlich, and Wilfried Delker, North-Rhine, both of Fed. Rep. of Germany, assignors to American Standard Inc., New York, N.Y.

Filed Mar. 18, 1986, Ser. No. 840,845

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1985, 3509667

Int. Cl.[4] F16K *23/00*

U.S. Cl. 137—315 **5 Claims**



1. A sanitary mixing valve comprising:

an interchangeable valve body made of ceramic material and a replaceable cartridge having control elements operably mounted therein;

said valve body, being of unitary design, is removabl mounted to a connecting member;

said connecting member including a cylindrically shaped housing having a base portion which is formed having water supply passages therein, is mounted to said control elements;

sealing means interposed between said valve body and said connecting member to provide a watertight fit;

said control elements mounted to said base portion;

said housing formed with collar-like steps extending around the outside surface thereof;

each of said collar-like steps having differing diameters which increase downwardly toward the base portion thereof;

each of said collar-like steps, having an axial seal mounted thereon and which interacts with corresponding steps formed around the inner surface of said valve body to provide a watertight seal therebetween;

said cartridge having an externally threaded upper end;

an internally threaded ring being coupled to said threaded upper end of said cartridge to hold said inner housing in place; and

a second threaded ring having a horizontally extending collar which threadedly engages said internally threaded ring to mount said cartridge to said valve body.

4,685,488

BALL VALVE

Susan E. Corbin, Mentor; Cal R. Brown, Euclid; David W. Crozier, Mayfield Heights, and Peter C. Williams, Cleveland Heights, all of Ohio, assignors to Whitey Co., Highland Hts., Ohio

Filed Feb. 7, 1986, Ser. No. 827,104

Int. Cl.[4] F16K *27/06*

U.S. Cl. 137—328 **1 Claim**

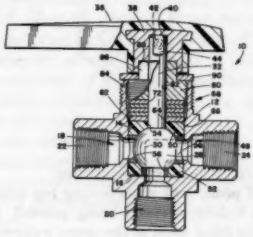
1. A ball valve comprising:

a housing having a cylindrical bore extending inwardly from the exterior of said housing and defining a valve chamber with inlet and outlet passages connected from the exterior of said housing to said chamber;

a ball valve member positioned axially of said chamber and having a cylindrical operating stem extending axially of said chamber to a position exterior of said housing;

a mass of resilient packing material surrounding said ball and substantially filling said chamber; and

adjustable means for applying a compressive load to said packing to cause it to sealingly engage the inner walls of said chamber and the exterior of said ball member; said adjustable means including a rigid metal circular gland member closely received in said bore and extending transversely thereof in engagement with said packing, a circular opening in said gland member surrounding closely and guided by said operating stem, a plurality of stacked disk springs having a first central opening radially dimensioned to freely receive and surrounding and guided by said stem



in both unstressed and compressed conditions and positioned on said gland member on the side opposite said packing, the outer diameters of said disk springs dimensioned for close receipt in said bore, a packing nut member closely received in said bore outwardly of said disk spring means and having a second central opening freely receiving said stem and an inner surface drivingly engaging said disk springs for applying an adjustable compressive preload to said disk springs, and means for adjustably moving said packing nut member toward said packing gland to compress said disk springs and apply a biasing force to said packing, said means for adjustably moving said packing nut member including cooperating threads formed on said packing nut and said bore and tool engaging surfaces formed on said packing nut.

4,685,489

VALVE ASSEMBLY AND COMPRESSOR MODULATION APPARATUS

Kyung W. Yun, Troy; Othel L. Jones, and Gerald M. Long; John P. Elson, both of Sidney, all of Ohio, assignors to Copeland Corporation, Sidney, Ohio

Continuation-in-part of Ser. No. 599,770, Apr. 13, 1984, abandoned. This application Mar. 22, 1985, Ser. No. 714,011

Int. Cl.[4] F16K *15/02;* **F04B** *49/00*

U.S. Cl. 137—543.15 **64 Claims**

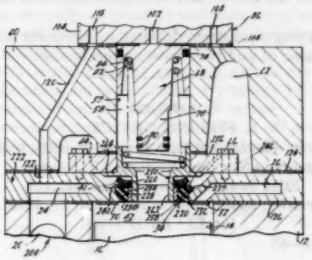
1. An improved valve assembly comprising:

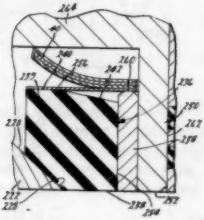
means having an opening, the wall of which defines a valve seat;

a neck member fixedly disposed in said opening and having a central opening therethrough with a plunger slidably disposed therein;

a valve member slidably disposed on said neck member and being movable between a closed position in which it engages said seat and an open position in which it is spaced from said seat, said valve and neck members and said plunger being substantially flush with one another on the

upstream side of said valve assembly when said valve member is in said closed position; and



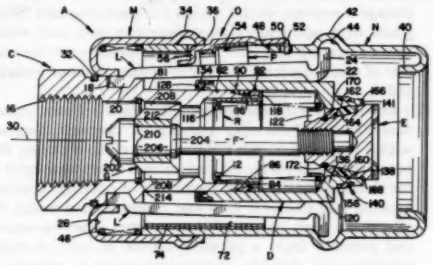


a seal member for preventing the flow of fluid between said valve member and said neck member when said valve member is in said closed position.

4,685,490
COUPLING

Richard J. Medvick, Shaker Heights; Richard C. Weber, Jr., Hudson; Ross L. Wagner, Akron, and Edward M. Brand, Cuyahoga Falls, all of Ohio, assignors to Swagelok Company, Hudson, Ohio

Continuation-in-part of Ser. No. 459,150, Jan. 19, 1983. This application Feb. 14, 1986, Ser. No. 829,311
Int. Cl.[4] F16L *55/10*
U.S. Cl. 137—614.03 **15 Claims**

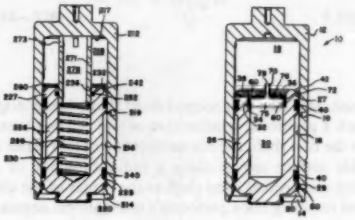


1. A seal between cooperating inner and outer fluid coupling parts having a common longitudinal axis and respectively including closely facing outer and inner surfaces extending generally parallel to said axis, said inner part having a terminal inner end spaced radially inward from said outer surface thereof, said inner part including an external slow taper surface extending therealong from said terminal inner end in a direction outwardly toward said outer surface thereof to define a packing receiving space between said slow taper surface and a portion of said inner surface on said outer part, and deformable packing ring shaped and sized for close reception in said packing receiving space and having inner and outer packing ring surface portions respectively shaped to generally correspond and cooperate with said slow taper surface and said inner surface of said outer part, and biasing means including a packing gland member guided centrally within said inner coupling part and having a radially outward extending flange for engaging said packing ring and biasing said packing ring into said packing receiving space.

4,685,491
ACCUMULATOR HAVING FLUID-LUBRICATING SEALS

Keith H. Fulmer, Mishawaka, and Donald J. Baker, South Bend, both of Ind., assignors to Allied Corporation, Morristown, N.J.

Filed Aug. 14, 1986, Ser. No. 896,488
Int. Cl.[4] F16L *55/04*
U.S. Cl. 138—31 **11 Claims**



1. A pressure accumulator, comprising a housing having a housing bore extending longitudinally within said housing, a piston having first and second piston ends disposed slidably within the bore and dividing the bore into first and second chambers, first and second fluids within the respective chambers, characterized in that the piston has a U-shaped shaped cross section including a piston bore extending from a bore opening at the first piston end, the first piston end and second piston end having respective sealing means thereat, the first fluid under high pressure within the first chamber and a lubricating fluid disposed in said first chamber at the first piston end, the bore opening being enclosed by a sleeve member received within the bore opening and extending longitudinally away from said first piston end and into said first chamber so that the lubricating fluid remains at the first piston end and does not enter into the piston bore, and the sleeve member having a sleeve opening permitting the first fluid under high pressure in the first chamber to communicate freely with the piston bore.

4,685,492
READING DEVICE IN DOBBY MACHINE

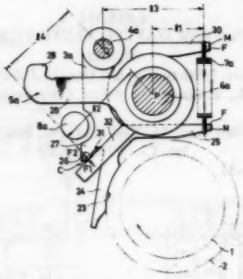
Hiroshi Takada, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jun. 10, 1985, Ser. No. 743,475
Claims priority, application Japan, Jun. 11, 1984, 59-119712
Int. Cl.[4] D03C *1/06*
U.S. Cl. 139—68 **17 Claims**

1. A reading device in a dobby machine, comprising:
a reading lever adapted to pivot between first and second positions;
a first fixed shaft pivotally supporting the reading lever;
means for intermittently urging the reading lever toward said first position;
a retaining hook adapted to pivot with said reading lever between two positions of engagement and disengagement with respect to a movable hook such that the retaining hook is in the engagement position when the reading lever is in the first position and the retaining hook is in the position of disengagement when the reading lever is in the second position;

a second fixed shaft pivotally supporting the retaining hook, said reading lever having a slider which is in abuttment with a slide surface formed on said retaining hook; and

a spring acting in a direction such that said slider comes into pressure contact with said slide surface, said spring being connected between said reading lever and said retaining



hook, said first and second fixed shafts being disposed in such a positional relation that as said reading lever pivots on the first shaft, the contact portion of said slider and said slide surface moves along a radial direction of a circle with said second fixed shaft as the center of the circle and said retaining hook performs a non-uniform angular velocity motion.

4,685,493

REINFORCING BAR BINDING DEVICE

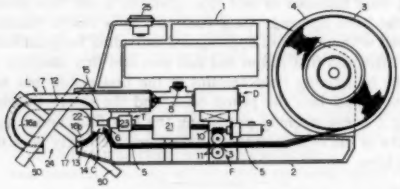
Sadao Yuguchi, 4-36, Honda 1-chome, Nishi-ku, Osaka-shi, Osaka, Japan

Filed Dec. 31, 1985, Ser. No. 815,108

Claims priority, application Japan, Feb. 18, 1985, 60-29939

Int. Cl.[4] B21F *15/04*

U.S. Cl. 140—119 **7 Claims**



1. A portable device for binding reinforcing bars at an intersection thereof with a length of binding wire, comprising:

a frame with a handle;

a feed reel of binding wire detachably mounted on said frame adjacent one end of said frame;

a wire loop forming mechanism mounted on said frame adjacent the other end of said frame, said loop forming mechanism having a J-shaped movable member displacable lengthwise of said frame for protruding the free end of said movable member from said other end of said frame and forming a hook between said protruding free end and said frame;

drive means for displacing said movable member to protrude said member and forming said hook and for retracting said movable members;

a wire path for withdrawing wire from said feed reel extending lengthwise of said frame and around the inner surface of said J-shaped movable member and back into said frame when said movable member is retracted;

a wire delivery mechanism disposed in said path of withdrawal of wire in said frame for feeding said wire along said path;

a wire twisting mechanism disposed in said other end of said frame at the end of said wire path back into said frame; and

a wire cutting mechanism disposed ins aid frame inwardly in said frame of said wire twisting mechanism.

4,685,494

FILLING DEVICE

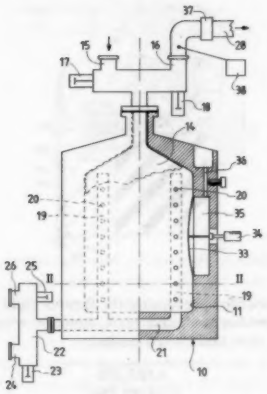
Peter Löfgren, Hovås, and Nils Årthun, Partille, both of Sweden, assignors to Steridose Systems AB, Sweden

Filed Jun. 19, 1984, Ser. No. 622,129

Claims priority, application Sweden, Jun. 27, 1983, 8303656

Int. Cl.[4] B67D *5/00*

U.S. Cl. 141—65 **9 Claims**



5. A device for filling a container comprising:

(A) a housing defining a dosage chamber therein;

(B) an at least partly flexible temporary storage container disposed in said chamber, said temporary storage container normally being of a size that it can fully line all of the walls of said chamber;

(C) inlet means for supplying filling goods to said temporary storage container, outlet means for emptying said filling goods from said temporary storage container, and means communicating said inlet and outlet means with the interior of said temporary storage container without leakage; and

(D) means for establishing a predetermined pressure condition inside said chamber comprising channels disposed within the walls of said housing, said channels being disposed at least in part in a direction that is not transverse to the thickness of the walls, a plurality of openings communicating said channels with said chamber, and means for selectively applying one of vacuum from a vacuum source and pressure from a pressure source to said channels, whereby said plurality of openings serves to selectively communicate vacuum or pressure to said chamber.

4,685,495

PORTABLE WOOD PROCESSING MACHINE

Floyd Freeman, R.R. 3, Cloverdale, Ind. 46120

Filed May 19, 1986, Ser. No. 864,495

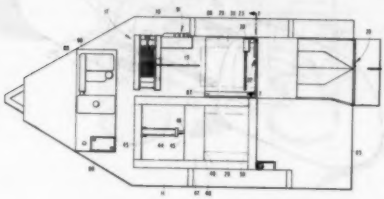
Int. Cl.[4] B27L *7/00*

U.S. Cl. 144—3 K **12 Claims**

10. A machine for processing fallen trees located remotely therefrom into split logs comprising:

a mobile main frame allowing said main frame to be moved into a forest;

chute means on said main frame to receive a fallen tree;
a winch mounted to said main frame including a cable to removably attach to said fallen tree located remotely from the machine and pull said tree into said chute means;
saw means movably mounted to said main frame and operable to cut off a portion of said fallen tree positioned in said chute means;
a secondary frame mounted atop said mobile main frame, said secondary frame including a plurality of members interconnected together to form rail means;
splitting means operable to receive said cut off portion and split said cut-off portion into split logs and including;



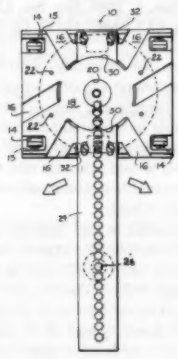
ramming means which includes a power cylinder with an extendable rod and a contact surface located distally on said rod to engage one end of said cut-off portion and to apply horizontal force thereagainst; and,
cutting means to engage the opposite end of said cut-off portion;
wherein said contact surface is supported slidably upon said rail means to move to and from said cutting means;
and wherein said cylinder and said cutting means are mounted to said members thereby absorbing said horizontal force applied by said contact surface against said cut-off portion and isolating said main frame from said force.

4,685,496

ACCESSORY TOOL FOR HAND ROUTERS

Lester R. Livick, 15106 Beatty St., San Leandro, Calif. 94579

Filed Mar. 3, 1986, Ser. No. 835,753
Int. Cl.[4] B27C *5/10, 1/20*
U.S. Cl. 144—134 D **11 Claims**



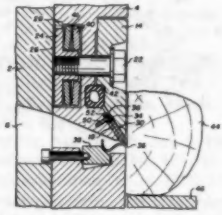
1. An accessory tool for electrical hand routers comprising:
a rectangular base unit having first parallel side edges, second parallel side edges, a bottom surface and a top surface, said top surface having therein a recess for receiving the base of an electrical hand router and an opening in said recess and extending through said base unit for receiving a router spindle and cutting member;
a plurality of rotatable wheels, one of said plurality being mounted adjacent each corner of said rectangular base unit, each of said wheels being mounted on an axis parallel with first parallel side edges of said base unit and having rolling surfaces extending below said base unit bottom surface; and
a plurality of discharge slots formed in said base unit between the router spindle opening and the exterior of said base unit for the discharge of dust and shavings generated by the router in a direction away from any of said rotatable wheels.

4,685,497

KNIFE ARRANGEMENT FOR A WAFERIZER

Cameron D. Mierau, Clearbrook; Patrick J. Cramond, Coquitlam, and Douglas C. Beer, Bellingham, all of Canada, assignors to CAE Machinery Ltd., Vancouver, Canada

Filed May 29, 1986, Ser. No. 868,811
Int. Cl.[4] B27C *7/10*
U.S. Cl. 144—176 **9 Claims**



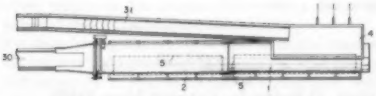
1. In a waferizing apparatus having a rotatable disc;
knife carriers mounted on the disc;
spaced openings between the carriers;
openings in the disc corresponding to the openings in the carrier;
a knife associated with each opening;
a knife clamp bolted to the carrier to clamp each knife in position the improvement comprising:
resilient means urging each knife clamp inwardly against the carrier to clamp each knife in position in the apparatus; and
means to receive a fluid under pressure and movable, upon receipt of the fluid under pressure, to separate the clamp and the carrier to permit removal of each knife.

4,685,498

BARKING MACHINE

Junichi Nakajima; Kenji Nakayama, and Takeshi Takizawa, all of Shizuoka, Japan, assignors to Fuji Kogyo K.K., Shizuoka, Japan

Filed Nov. 28, 1984, Ser. No. 675,871
Claims priority, application Japan, Feb. 8, 1984, 59-021421; Feb. 8, 1984, 59-021422; Jul. 12, 1984, 59-145705; Jul. 31, 1984, 59-160967; Oct. 4, 1984, 59-208841
Int. Cl.[4] B27L *1/00*
U.S. Cl. 144—208 B **17 Claims**



1. An improved barking machine, comprising:
a receiving container, fixed to a body frame, for accommodating logs, said container being formed with an opening at the bottom portion thereof,

rotary members having axes of rotation disposed parallel to and below said receiving container such that the top portion of each said rotary member enters said opening, and

a plurality of barking teeth, each having a height gradually increased in a direction opposite to the direction of rotation of each said rotary member, said teeth being mounted to the outer circumference of each said rotary member to bark the logs loaded in said receiving container while pushing up and rolling said logs.

4,685,499

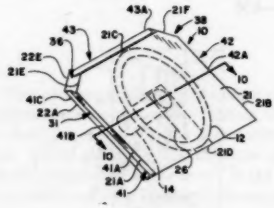
STEERING WHEEL COVER

Todd W. Black, 8311 Woodlake Pl., Tampa, Fla. 33615

Filed Apr. 18, 1986, Ser. No. 853,756

Int. Cl.[4] B62D *1/06*

U.S. Cl. 150—52 M **19 Claims**



1. A disposable cover for preventing the impingement of solar radiation upon a steering wheel mounted on a steering wheel column, comprising in combination:

a first and a second sheet member each having a top edge, a bottom edge and plural side edges;

said first sheet member being opaque for preventing the transmission of the solar radiation therethrough;

said second sheet member having an aperture therein for accommodating the steering wheel column;

top interconnecting means for interconnecting said top edges of said first and second sheet member respectively;

side interconnecting means for interconnecting said plural side edges of said first and second sheet members respectively;

said top interconnecting means and said side interconnecting means establishing said first and second sheet members to be in a substantially parallel spaced apart relationship for enabling said first and second sheet members to be disposed on opposed sides of the steering wheel when said top interconnecting means engage the top of the steering wheel and when said side interconnecting means engage the sides of the steering wheel to laterally position said first and second sheet members relative to the steering wheel and with said aperture of said second sheet member accommodating the steering wheel column enabling said first sheet member to protect the steering wheel from the solar radiation;

said bottom edges defining an opening for permitting insertion of the steering wheel between said first and second sheet members; and

a vent aperture located proximate the top of said first and second sheet members for enhancing ventilation through the cover.

4,685,500

CLEAT COVER

Dana Silvia, 43 Border St., Cohasset, Mass. 02025

Filed Sep. 4, 1986, Ser. No. 904,012

Int. Cl.[4] B63B *21/04*

U.S. Cl. 150—52 R **9 Claims**

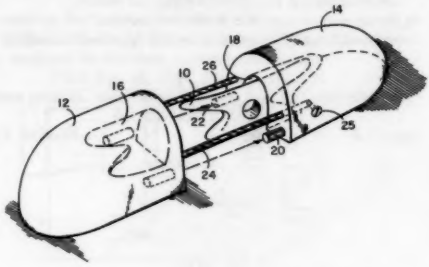
1. A device for covering a cleat comprising:

a first cover portion having an aperture defined therein, said aperture being of a size and shape somewhat larger than the size and shape of half said cleat;

a second cover portion having an aperture defined therein, said aperture being of a size and shape somewhat larger than the size and shape of the other half of said cleat;

said first and second cover portions adapted to be placed together around said cleat to cover said cleat;

elastic means positioned between said first and second cover



portions adapted to hold said cover portions in place around said cleat and when said cover portions are removed, said elastic means adapted to stretch to allow the release of first one cover portion and then the other cover portion from said cleat; and

further including key members on said first cover portion, said device having mating apertures defined on said second cover portion adapted to allow said cover portions to be locked in position to one another.

4,685,501

REMOTELY CONTROLLED INFLATION/DEFLATION VALVE SYSTEM FOR A VEHICLE TIRE

Donald E. Williams, 3252 Wyndhurst Ct., Dayton, Ohio 45440

Filed Mar. 6, 1986, Ser. No. 837,054

Int. Cl.[4] B60C *23/00, 29/00*

U.S. Cl. 152—417 **20 Claims**

1. A valve system for remotely controlling the inflation pressure within a pneumatic tire of a wheel mounted for rotation on an axle of a vehicle, the improvement comprising:

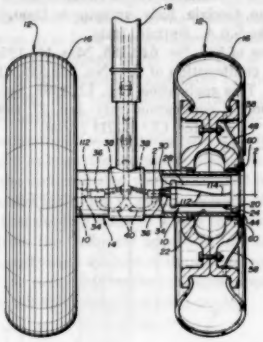
a housing disposable in and attachable to said axle;

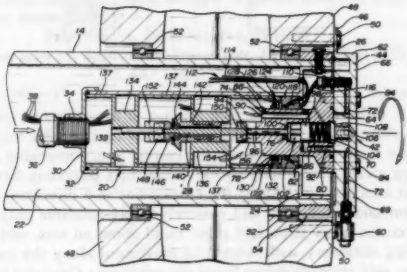
an air manifold attachable to said wheel for rotation therewith and relative to said housing, said manifold having an air channel connectable in communication with said pneumatic tire of said wheel;

a valve body disposable in said housing and being connectable to said air manifold for rotation therewith relative to said housing, said valve body having a hollow chamber and an air passage defined therein, said air passage having a first portion communicating at its outer end with the interior of said housing and at its inner end with said chamber and a second portion communicating at its inner end with said chamber and at its outer end with said air channel of said manifold when said valve body is disposed in said housing and connected to said manifold; and

a valve spool disposed in said chamber of said valve body and reciprocally movable therein relative to said body between valve opening and closing positions, said spool having a recess defined therein which establishes communication between said inner ends of said first and second portions of said air passage in said body when said spool is moved to its valve opening position, said spool having a

land defined thereon which blocks communication between said inner ends of said first and second portions of





said air passage in said body when said spool is moved to its valve closing position.

4,685,502

MULTIPLE-GLAZED WINDOW ASSEMBLY

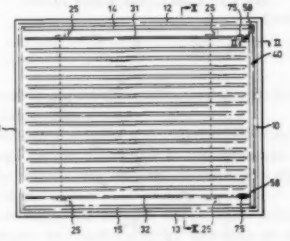
Robbert E. Spangenberg, Oosterhout, Netherlands, assignor to Hunter Douglas International N.V., Curacao, Netherlands Antilles

Filed Nov. 13, 1985, Ser. No. 797,576

Claims priority, application European Pat. Off., Apr. 26, 1985, 85302994.0

Int. Cl.[4] E06B *3/32*

U.S. Cl. 160—107 **26 Claims**



1. A slat tilting mechanism unit for use in mounting a venetian blind in a mounted position between two panes of glass (**16, 17**) of a multiple glazed window forming an opening to be covered by said blind, in which the blind comprises an upper elongate supporting member (**31**) extending across all or part of the width of the blind, means (**25**) for pivotally mounting the supporting member about its logitudinal axis, slat supporting means (**33**) extending from said upper supporting member (**31**) and a plurality of slats (**34**) having slat ends carried by said supporting means (**33**), said slat tilting mechanism unit being characterised in that it is separate from the blind and includes an elongate body (**40**) positionable at a side of the opening to be covered by the blind, so as to confront the slat ends at one side of the mounted position of the blind, a bearing (**46**) on said body (**4**), adjacent one end of the body, a rotatable drive member (**53**) mounted in said bearing (**46**), an operating member (**64–67**) linearly movable longitudinally of said body under magnetic effect by a linearly movable actuating member (**69**) mounted externally of the multiple glazed window, a drive element (**61**) connected between said operating member and said rotatable drive member (**53**), whereby linear movement of said opertaing member (**64–67**) will cause simultaneous rotation of said drive member (**53**) in the same rotational sense, a connection (**57, 58**) on said rotatable drive member (**53**) drivingly connectable, to one end of the upper elongate supporting member (**31**).

4,685,503

METHOD OF MANUFACTURING A DISINTEGRATABLE CORE FOR CASTING

Kinichi Miyata, Ichinomiya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation of Ser. No. 815,781, Jan. 3, 1986, abandoned, which is a continuation of Ser. No. 631,311, Jul. 16, 1984, abandoned. This application Dec. 4, 1986, Ser. No. 939,286

Claims priority, application Japan, Sep. 12, 1983, 58-166772

Int. Cl.[4] B22C *1/22, 3/00, 9/10*

U.S. Cl. 164—14 **8 Claims**

1. A method of manufacturing a disintegrable core for castings, which consists essentially of:

(a) mixing an organic binding material with a fireproof granular substance,

(b) molding said mixture to form a core of a prescribed shape,

(c) impregnating said molded core with an aluminum-phosphorus oxide water solution which has a concentration of about 13 to 29 weight percent, to thereby form an impregnated core, and

(d) heating said impregnated core at a temperature of about 400° to 1000° C. for about 1 hour.

4,685,504

FOUNDRY SAND FEEDING APPARATUS

Robert H. Bond, and Richard B. Kraus, both of Barrington, Ill., assignors to General Kinematics Corporation, Barrington, Ill.

PCT No. PCT/US84/01738, § 371 Date Dec. 5, 1984, § 102(e) Date Dec. 5, 1984, PCT Pub. No. WO86/02582, PCT Pub. Date May 9, 1986

Continuation of Ser. No. 690,482, Dec. 5, 1984, abandoned. This PCT application Oct. 30, 1984, Ser. No. 869,451

Int. Cl.[4] B22C *15/10*

U.S. Cl. 164—203 **4 Claims**

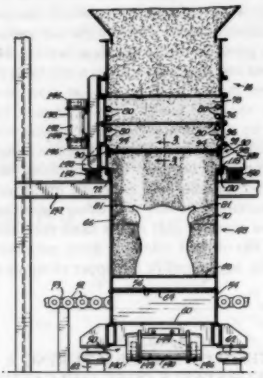
1. An improved foundry apparatus of the type having a flask for holding particulate material, a pattern associated with the flask and a hopper above the pattern for delivering a flow of particulate material over the pattern, the improvement comprising:

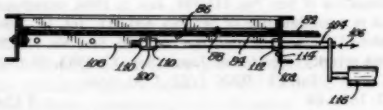
cooling means in the hopper for cooling the particulate material being passed from the hopper,

a first plate having a plurality of apertures and a second plate having a second plurality of apertures, said first and second plurality of apertures being registerable with each other to define particulate material passage areas and said particulate material passage areas being irregularly spaced relative to one another so that particulate material can be directed selectively and nonuniformly over the pattern;

means for adjustably mounting the plates relative to each other so that the apertures can be brought into adjustable

registration with each other so that a desired flow rate for the particulate material over the pattern can be chosen; means for vibrating the cooling means for advancing the particulate material toward the first plate; and





means for vibrating the flask to avoid the formation of gaps and cause a substantially uniform compaction of particulate material about the pattern.

4,685,505

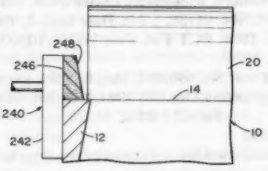
NON-CONTACTING SIDE EDGE DAM MEANS FOR ROLL CASTING

William G. Truckner, Avonmore; Charles L. Jordan, New Kensington, and William R. Sharkins, Curtisville, all of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jan. 6, 1986, Ser. No. 816,240

Int. Cl.[4] B22D *11/06*

U.S. Cl. 164—415 **5 Claims**



1. An improved roll casting apparatus comprising side edge dam means comprising laterally adjustable plenum means with porous gas egress means therein located at the nip of a pair of opposing rollers for delivering a flow of gas at a pressure of up to 35 psi toward the side edges of metal as it flows, from a nozzle tip assembly in communication with a source of molten metal, through said nip of said opposing rollers to thereby contain the side flow of such metal during the roll casting operation, said porous gas egress means having a slanted edge diverging away from the side of said metal beyond the nip of sid rollers to provide a divergent opening in the direction of metal flow.

4,685,506

BILLET LAUNCHING DEVICE IN CONTINUOUS CASTING MACHINES

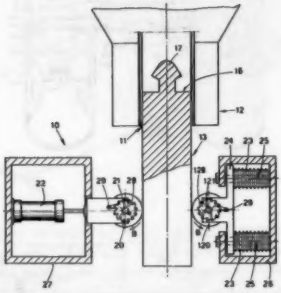
Fulvio Fasano, Gorizia, Italy, assignor to Danieli & C. Officine Meccaniche S.p.A., Buttrio, Italy

Continuation of Ser. No. 610,185, May 15, 1984, abandoned, which is a continuation of Ser. No. 335,515, Dec. 29, 1981, abandoned. This application Dec. 12, 1985, Ser. No. 807,218

Claims priority, application Italy, Jan. 27, 1981, 83318 A/81

Int. Cl.[4] B22D *11/08*

U.S. Cl. 164—416 **5 Claims**



1. Billet launching device for use in a continuous casting machine of the type employed for moving the billet from an ingot mold oscillating along the casting line, comprising gripping means driven only by movement of a launching element and attached billet along the casting line in a direction away from said ingot mold and passively freely rotatable only in a direction away from said ingot mold about an axis, said axis being stationary with respect to movement along the casting line, said gripping means being placeable near the outlet of the ingot mold to maintain continuous contact and to grip said launching element and attached billet as they move between said means, said gripping means cooperating with said launching element and billet to permit movement of the billet in one longitudinal direction only.

4,685,507

PROCESS FOR THE STAGED HEATING OF A MATERIAL IN A TREATMENT APPARATUS AND SUBSEQUENT COOLING THEREOF

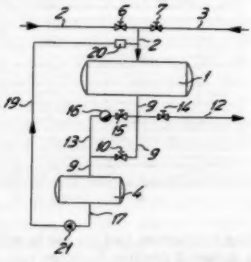
Otmar U. Schäfer, Pienzenauerstrasse 9, 8000 München 80, Fed. Rep. of Germany

Filed Jun. 28, 1983, Ser. No. 508,591

Claims priority, application Fed. Rep. of Germany, Jul. 7, 1982, 3225403

Int. Cl.[4] F28C *3/00*; F28D *21/00*

U.S. Cl. 165—2 **9 Claims**



1. A process for stepwise treating a material, comprising the steps of: preheating the material in a preheating phase in a treatment apparatus; heating the preheated material in a heat-

ing phase by direct contact with steam in said treatment apparatus; cooling the heated material in the treatment apparatus after the heating phase, transferring contaminated water resulting from condensation of the steam in the heating phase in the treatment apparatus to at least one storage container for storage, feeding the contaminated water from the at least one storage container to the treatment apparatus for preheatiang fresh material therein in a subsequent operating cycle, and removing contaminated water after cooling from the treatment apparatus, the contaminated water being passed in the preheating phase from said at least one storage container to the treatment apparatus, the contaminated water produced in the heating phase being collected in the storage container, the cooling step including a first cooling stage in which the contaminated water is passed from the treatment apparatus into the storage container, and an equivalent amount of the contaminated water is removed from the process from the treatment apparatus in a preheating phase of a following operating cycle.

4,685,508

AUTOMOTIVE AIR-CONDITIONING APPARATUS WITH DEMIST CONTROL

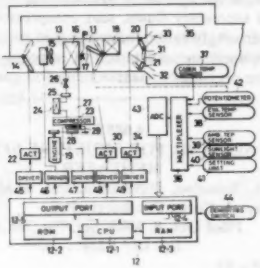
Katumi Iida, Saitama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

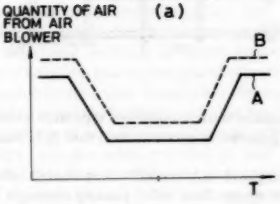
Filed Oct. 4, 1985, Ser. No. 784,248

Claims priority, application Japan, Oct. 12, 1984, 59-212675

Int. Cl.[4] G05D *21/00*

U.S. Cl. 165—17 **2 Claims**





1. An automobile air-conditioning apparatus in an automobile having a cabin, comprising:

an intake damper openable and closable for controlling a first passage for circulating air in the cabin and a second passage for introducing ambient air through a duct means into the cabin;

an air blower disposed in said duct means between said intake damper and said cabin for drawing air from said intake damper into said cabin, said air blower connected to a drive source for adjusting an amount of air fed by said air blower from said intake damper;

a cooling system including an evaporator interposed in said duct means between said air blower and said cabin;

a heater core interposed in said duct means between said evaporator and said cabin for heating air that has passed through said evaporator;

an air mixing damper interposed in said duct means between said evaporator and said heater core for controlling an amount of air that has passed through said evaporation and is to be fed to said heater core;

a mode selector damper means interposed in said duct means between said heater core and said cabin for selectively opening and closing a demisting-air outlet, a venting outlet, and a heated-air outlet, each of which connect said duct means to said cabin;

a control system for controlling an amount of air fed from said air blower and an amount of air fed through said evaporator through said air mixing damper to said heater core responsive to a difference between a temperature preset by a temperature setting unit and a temperature of air in said cabin to automatically adjust the temperature of air in said cabin when said control system is set in an automatic adjusting mode, said control system operable when set in a demisting mode with the dimisting-air outlet being open to control said device source to increase the amount of air fed from said air blower to an amount greater than the amount of air fed from said air blower when said control system is set in said automatic adjusting mode;

an evaporator-temperature sensor for detecting a temperature of air between said evaporator and said air mixing damper;

an ambient-air temperature sensor for detecting a temperature of ambient air outside of said cabin; and

said control system also limiting the opening of said air mixing damper to control the amount of air fed through said evaporator to said heater core dependent on a temperature detected by said evaporator-temperature sensor and a temperature detected by said ambient-air temperature sensor when said control system is set in said demisting mode with said demisting-air outlet being open.

4,685,509

COOLING DEVICE FOR A MULTISTAGE COMPRESSOR

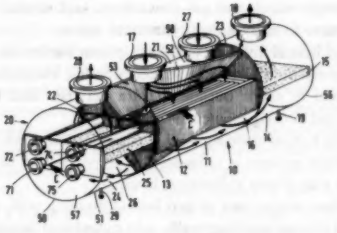
Walter Koeller, Duisburg, Fed. Rep. of Germany, assignor to Mannesmann Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Aug. 19, 1985, Ser. No. 766,654

Claims priority, application Fed. Rep. of Germany, Aug. 17, 1984, 3430782; Aug. 15, 1985, 3513936

Int. Cl.[4] F04D *29/58*

U.S. Cl. 165—47 **8 Claims**



1. A cooling device for cooling the gas in a multistage compressor, said cooling device comprising:

(a) a cylindrical housing having a first end wall, a second end wall, a central axis, and a cylindrical housing wall;

(b) a first dividing wall perpendicular to the central axis of said cylindrical housing spaced from said first end wall of said cylindrical housing and a second dividing wall perpendicular to the central axis of said cylindrical housing spaced from said secodd end wall of said cylindrical housing, said first and second dividing walls dividing said

cylindrical housing into a first cylindrical space, a central chamber, and a second cylindrical space;

(c) a first cooling element located in said central chamberand extending parallel to the central axis of said cylindrical housing;

(d) a second cooling element located in said central chamber and extending parallel to the central axis of said cylindrical housing and to said first cooling element;

(e) a first water separator located in said first cylindrical space, said first water separator extending between said first end wall and said first dividing wall and dividing said first cylindrical space into a top half and a bottom half;

(f) a second water separator located in said second cylindrical space, said second water separator extending between said second end wall and said second dividing wall and dividing said second cylindrical spaced into a top half and bottom half;

(g) a first inlet tube which, during use of the cooling device, leads from the multistage compressor and communicates with said central chamber adjacent said first cooling element;

(h) a second inlet tube which, during use of the cooling device, leads from the multistage compressor and communicates with said central chamber adjacent said second cooling element;

(i) a first outlet tube which, during use of the cooling device, leads from said first cylindrical space to the multistage compressor;

(j) a second outlet tube which, during use of the cooling device, leads from said second cylindrical space to the multistage compressor; and

(k) a helical dividing wall which:

(i) is located in said central chamber;

(ii) is connected to said housing wall and to said first and second dividing walls;

(iii) runs axially parallel to the central axis of said cylindrical housing; and

(iv) and extends between sid first and second cooling elements;

wherein:

(l) there is first aperture in said first dividing wall through which the gas flows from said first cooling element to said first cylindrical space;

(m) there is a second aperture in said second dividing wall through which the gas flows from said second cooling element to said second cylindrical space;

(n) said helical dividing wall has a planar surface in the area between said first and second cooling elements and is helical in shape outside the ara between said first and second cooling elements;

(o) said helical dividing wall is composed of three straight-surface sections in cross-section perpendicular to the central axis of said cylindrical housing;

(p) a first helical part of said helical dividing wall, said first and second dividing walls, said cylindrical housing wall, and the inlet surface of said first cooling element define a first free space;

(q) a second helical part of said helical dividing wall, said first and second dividing walls, said cylindrical housing wall, and the inlet surface of said second cooling element define a second free space;

(r) said first free space tapers off in the direction of said first dividing wall; and

(s) said second free space tapers off in the direction of said second dividing wall.

4,685,510

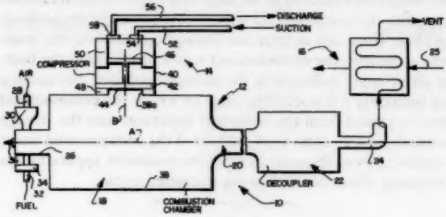
PULSE COMBUSTION ENGINE AND HEAT TRANSFER SYSTEM

Richard J. Priem, Middleburg Heights; M. Reza Ghassemzadeh, Cleveland, and James C. Griffiths, Lyndhurst, all of Ohio, assignors to American Gas Association, Cleveland, Ohio

Filed Apr. 24, 1986, Ser. No. 855,809

Int. Cl.[4] F25B *27/00*

U.S. Cl. 165—62 **16 Claims**



12. A fluid heating and cooling system comprising in combination a pulse combustion heat engine, primary heat exchange means for transferring heat rejected by the heat engine to a primary fluid to be heated, and a heat pump system, said heat engine including chamber means for pulse combustion of a fuel to provide combustion gases which have cyclic periods of positive and negative pressure, said heat pump system including a compressor having a piston arranged for reciprocatory motion to pressurize and circulate a working fluid to secondary heat exchange means for transferring heat between first and second secondary fluids, said compressor also including means for drivingly interconnecting said piston and chamber means to reciprocate said piston in response to said positive and negative pressures of said combustion gases.

4,685,511

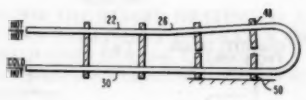
TUBE SUPPORT FOR MOISTURE SEPARATOR REHEATER

Raymond A. Sabatino, Havertown, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 8, 1985, Ser. No. 785,379

Int. Cl.[4] F28F *7/00*

U.S. Cl. 165—82 **4 Claims**



1. In combination with a moisture separator reheater for a nuclear steam generating power plant, said reheater comprising:

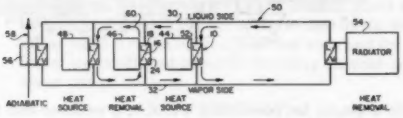
a sealed elongated substantially horizontal tubular shell member, a cycle fluid inlet passing through said shell member in predetermined position, moisture separator means positioned within said shell member proximate the bottom portion thereof, heat exhanger means comprising a plurality of elongated metallic U-shaped members disposed substantially within said shell member, a tube sheet member supporting said U-shaped tube members at one end thereof, a tube support member means in supportive relationship with said tube members, the U-shaped tube members each having a top leg portion, a U-bend portion and a bottom leg portion, said top leg portion and said bottom leg portion positioned substantially horizontally within said shell member, said tube support member means having aperture means therethrough, each of said bottom leg portions and said top leg portions of said U-shaped tube members passing through said aperture means

and supported by said tube support member means, a dome-shaped head member affixed to a first side of said tube sheet member in sealing relationship therewith forming a chamber therein, a partition means disposed within said chamber and dividing said chamber into a lower chamber and an upper chamber, said head member having a heating fluid inlet passing therethrough the improvement which comprises: said tube support member means proximate said U-bend portion of said U-shaped tube members each comprising an upper movable tube support member and a lower immovable tube support member, the remainder of said tube support means being immovable, said upper movable tube support member spacing and supporting said top leg portions of said U-shaped tube members, said lower immovable tube support member spacing and supporting said bottom leg portions of said U-shaped tube members, whereby the top leg portions of the U-shaped tube members proximate said U-bend are permitted to move to compensate for any increase in radius in the U-bend portion of the U-shaped tube member due to thermal expansion.

4,685,512
CAPILLARY-PUMPED HEAT TRANSFER PANEL AND SYSTEM

Fred Edelstein, Hauppauge; Robert A. Haslett, Dix Hills; Robert L. Kosson, Massapequa, and William Harwell, Coram, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Division of Ser. No. 360,321, Mar. 22, 1982, Pat. No. 4,602,679. This application Jul. 24, 1986, Ser. No. 889,012
Int. Cl.[4] F28D *15/00*
U.S. Cl. 165—104.14 **1 Claim**

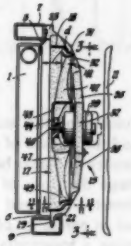


1. A thermal management system comprising a plurality of capillary-pumped panels arranged in parallel in a heat transfer circuit, said panels each comprising first and second coextensive flat planar plates sealed together with a thin, fine-pore sheet wick interposed therebetween, a vapor channel network and an associated network of liquid grooves in the faying surfaces of said first and second plates of each of said panels in fluid communication with one another through said wick, said wick having isotropic porosity such that liquid is drawn transverse to the axis of said liquid grooves on either side thereof to completely wet the wick exposed to said vapor channels, dedicated vapor lines outside said panels connecting said vapor channel networks of each panel with one another for the circulation of vapor therebetween, dedicated liquid lines outside said panels connecting said liquid groove network of each panel with one another for the circulation of liquid therebetween, said circuit being charged with a heat pipe working fluid, said panels mounting equipment in a heat transfer relationship therewith, heat emitting equipment mounted on at least one of said panels, heat removing equipment mounted on at least one other of said panels, whereby a heat input into a number of said panels causes a vaporization of fluid from said wicks therein on the surface thereof facing the vapor channel network and the removal of heat from another of said panels causes a condensation of fluid therein such that a circulation of fluid by the capillary pumping of said wicks that serves to transport heat between widely spaced panels in said circuit is provided.

4,685,513
ENGINE COOLING FAN AND FAN SHROUDING ARRANGEMENT

Richard E. Longhouse, Dayton, and Nick Vona, Springboro, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 324,611, Nov. 24, 1981, abandoned. This application Oct. 24, 1984, Ser. No. 665,412
Int. Cl.[4] F01D *5/22*; **F01P** *7/10*
U.S. Cl. 165—121 **4 Claims**



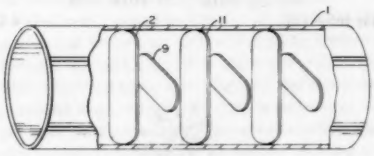
1. Vehicle engine cooling fan and shrouding assembly for forcing cooling air through a radiator in which engine coolant is circulated comprising support means adjacent to the radiator, a fan shroud and mounting shell operatively secured to said support means adjacent to said radiator, said shell having a peripheral forwardly extending wall portion to provide an intake for air flowing through said radiator, said shell further having a generally cylindrical and rearwardly extending portion to provide a reduced dimensioned air ejector for said shell, spoke means extending inwardly from said air ejector, a fan drive motor supported by said spoke means extending axially into said shell, said motor having a rotatable output shaft extending outwardly therefrom toward said radiator and having a terminal end portion, an engine cooling fan operatively driven by said drive motor and rotatably mounted in said shell, said fan having an annular hub with a cylindrical wall and a forward face disposed in a first plane rearward of and generally parallel to said radiator, a plurality of arcuately spaced blades extending generally radially outward from cylindrical wall of said hub, each of said blades having a convex front edge that sharply sweeps rearward from a respective point of attachment to said cylindrical wall of said hub closely adjacent to the forward face of said hub and said first plane thereof to a terminal end point in a second plane rearwardly of said first plane that extends through at least one half of the width of said cylindrical wall starting from the forward face of said hub, and an annular shroud securely fixed to the terminal end points of said blades for rotation therewith in said air ejector, said annular shroud being located radially inward of said wall portion and in a plane generally parallel to the radiator, said forward face of said hub having a centralized mount collar, fastener means securing said central mount collar to said end portion of said output shaft of said drive motor, said annular shroud being axially positioned by said blades for rotation in a plane substantially rearward of and axially spaced from said mount collar and at a predetermined spacing from said radiator whereby high volumes of air flowing through said radiator peripheral to said annular shroud and into the fixed shell turns generally radially inward and from all sides into the rotating shroud for intermixture with high volume air flowing into the fan from an area immediately in front of said rotating shroud for rearward discharge by said fan.

4,685,514

PLANAR HEAT EXCHANGE INSERT AND METHOD

Melvin H. Brown, Freeport, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 23, 1985, Ser. No. 812,408
Int. Cl.[4] F28F *1/00*
U.S. Cl. 165—177 **9 Claims**



1. A method of increasing the heat transfer between a gas flowing in a tube and the surface of the tube comprising:

establishing a plurality of planar heat exchange inserts positioned to impinge the flow of said gas along the tube surface, said inserts composed of a material having an absorptance and an emittance of at least about 50%, and each insert having a longitudinal axis and a lateral axis shorter than the longitudinal axis, said axes being at right angles to form a plane positioned to provide a substantially flat planar heat exchange surface normal to said gas flow;

providing a substantially unobstructed line of sight between each said insert and said tube surface;

positioning each said insert so that the edges parallel to the lateral axis abut the tube surface or tube wall, while providing a clearance between the tube surface or tube wall and the edges parallel to the longitudinal axis to maintain an unobstructed space of between about 20% to 80% of the cross sectional area of the tube; and

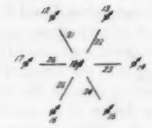
arranging the inserts in series so that the longitudinal axis of each insert is rotated 45° to 90° from the adjacent insert.

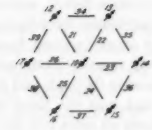
4,685,515

MODIFIED 7 SPOT PATTERNS OF HORIZONTAL AND VERTICAL WELLS FOR IMPROVING OIL RECOVERY EFFICIENCY

Wann-Sheng Huang, and Margaret A. Hight, both of Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Mar. 3, 1986, Ser. No. 835,703
Int. Cl.[4] E21B *43/24, 43/30*
U.S. Cl. 166—50 **23 Claims**





1. A modified 7 spot well pattern for recovering hydrocarbons from an underground formation, which comprises:

six substantially vertical corner wells forming a substantially hexagonal well pattern; and

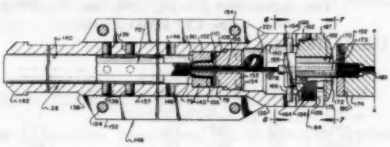
a first set of six substantially horizontal wells, each horizontal well having one end located relatively near the center of the substantially hexagonal well pattern and the other end located relatively near one of the six vertical wells.

4,685,516

APPARATUS FOR OPERATING WIRELINE TOOLS IN WELLBORES

Lonnie J. Smith, Allen, Tex.; Curtis G. Blount, Wasilla, Ak., and Steven G. Petermann, Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 21, 1986, Ser. No. 820,851
Int. Cl.[4] E21B *19/22*
U.S. Cl. 166—65.1 **21 Claims**



1. In a system for positioning a tool in a wellbore and for moving said tool longitudinally in said wellbore to a predetermined position;

an elongated, coilable tube adapted to be inserted in said wellbore, said tube being engageable with means for traversing said tube into and out of said wellbore;

electrical cable means extending through said tube from substantially one end thereof to the opposite end of said tube;

connector means at said one end of said tube for connecting said cable means to electrical conductor means; and

a connector assembly disposed at said opposite end of said tube which is insertable in said wellbore for connecting a downhole tool to said tube, said connector assembly including means forming a coupling including a sub connected to said opposite end of said tube and means engageable with said sub to permit angular displacement and limited lateral excursion of said tool with respect to said tube to minimize lateral pressure on said tool in said wellbore while precluding substantial rotation of said tool relative to said tube.

4,685,517

PRESSURE DIFFERENTIAL PLUNGER

Jay W. Baggett, 1209 Shasta, McAllen, Tex. 78501

Filed Jan. 22, 1985, Ser. No. 693,589
Int. Cl.[4] E21B *43/00, 34/12*
U.S. Cl. 166—105 **2 Claims**

1. A plunger for use in the pump barrel of a downhole pump comprising:

a substantially cylindrical body having a central longitudinal bore terminating at its upper end in a valve chamber and at its lower end in a venturi throat to enhance the rapid entry of well fluid into the bore;

a valve seat located at the upper end of the bore facing toward the valve chamber and having an opening therethrough of less diameter than the bore;

a valve element vertically reciprocable in the valve chamber, and adapted to seat on the valve seat upon an upward stroke of the cylindrical body in the pump barrel;

the valve chamber having a cross-sectional area sufficiently larger than the cross-sectional area of the bore to substantially reduce pressure build-up above the valve element upon downward movement of the cylindrical body within the pump barrel; and

the cylindrical body configured to be slidably fitted within the pump barrel such that the seal provided by the slidably fitting metal surfaces of the cylindrical body and the pump barrel are positioned between the valve element and the lower end of the bore.

4,685,518

BLAST JOINT

Jack R. Claycomb, Houston, Tex., assignor to Rickert Precision Industries, Inc., Plymouth, Mich.

Filed Aug. 7, 1985, Ser. No. 763,456
Int. Cl.[4] E21B *17/10*
U.S. Cl. 166—243 **19 Claims**

1. A blast joint comprising:

(a) at least two tubular members having threaded opposed ends;

(b) a plurality of erosion resistant rings encasing said tubular members;

(c) support means for supporting said erosion resistant rings about said tubular member;

(d) a cross-over connector externally threaded at one end and internally threaded at the other end for connecting said tubular members to form said blast joint, said cross-over connector providing a shoulder for supporting said erosion resistant rings on said tubular members;

(e) a support sleeve mounted about at least one of said tubular members, said support sleeve including slot means permitting access for gripping said tubular members therethrough for threadably connecting said cross-over connector to said tubular members; and

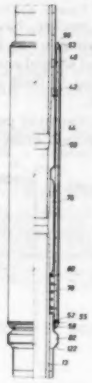
(f) a ring assembly supported by said support sleeve in telescoping relation about said erosion resistant rings, said ring assembly being movable between a first and second position, wherein said ring assembly encloses said cross-over connector upon shifting said ring assembly to said second position.

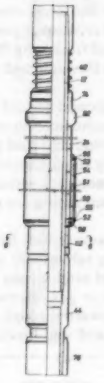
14. A blast joint comprising:

(a) at least two tubular members having threaded opposed ends;

(b) a plurality of erosion resistant rings encasing said tubular members;

(c) support means for supporting said erosion resistant rings about said tubular member;





(d) connector means for connecting said tubular members to form said blast joint; and

(e) at least one ring assembly supported on said tubular members in telescoping relation about said erosion-resistant rings, said ring assembly being movable between a first and second position, wherein said ring assembly encloses said connector means upon shifting said ring assembly to said second position.

4,685,519

HYDRAULIC FRACTURING AND GRAVEL PACKING METHOD EMPLOYING SPECIAL SAND CONTROL TECHNIQUE

Lawrence R. Stowe, Plano, and Malcolm K. Strubhar, Irving, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed May 2, 1985, Ser. No. 729,709
Int. Cl.[4] E21B *43/04, 43/267*
U.S. Cl. 166—278 **9 Claims**

1. A method for completing a well that penetrates a subterranean oil or gas reservoir, comprising:

(a) providing a borehole casing through said reservoir,

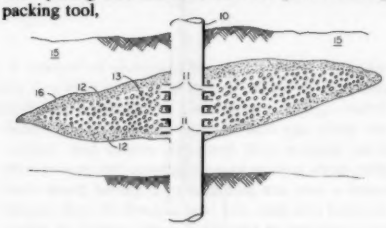
(b) perforating said casing at preselected intervals therealong to form at least one set of longitudinal, in-line perforation tunnels,

(c) locating a sand screen inside the casing and in juxtaposition with said perforation tunnels, a first annular section being formed between said sand screen and said casing,

(d) locating a cross-over tool, having a first cross-over port, inside said casing and above said sand screen, a second annular section being formed between said cross-over tool and said casing,

(e) locating a gravel packer, having a second cross-over port, inside said casing so as to form an isolating seal between said first and second annular sections, said second cross-over port being in fluid communication with said first cross-over port,

(f) opening said first cross-over port in said cross-over tool and opening said second cross-over port in said gravel packing tool,



(g) injecting a fracturing fluid containing a gravel packing sand down through said cross-over tool and out through said first and second cross-over ports into said first annular section, whereby said fracturing fluid is forced out of said first annular section through said perforation tunnels into said reservoir,

(h) terminating the injection of said fracturing fluid when a vertical fracture communicating with said casing has been formed in said reservoir and said gravel packing sand has been screened out by the formation sand of said reservoir to the extent that said perforation tunnels and said first annular section of said casing are packed with said gravel packing sand,

(i) removing said cross-over tool from inside said casing,

(j) placing a producing tubing into said casing in fluid communication with said sand screen tubing, and

(k) producing said oil or gas reservoir through said gravel packing sand and upward through said well casing by way of said sand screen and said production tubing.

4,685,520

OPEN HOLE PIPE RECOVERY CIRCULATION VALVE

Robert J. McDaniel, 711 Church St., Columbia, Miss. 39429

Filed Aug. 14, 1985, Ser. No. 766,093

Int. Cl.[4] E21B *31/03*

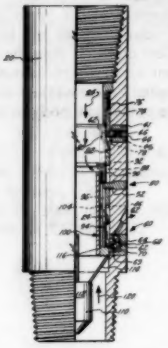
U.S. Cl. 166—332 **8 Claims**

1. A pipe recovery circulation valve apparatus for use in open hole well drilling to free a stuck drill string comprising a plurality of pipe sections having an internal pipe bore, comprising:

a. a series of valve bodies spaced longitudinally along the drill string, each having a continuous wall defining an internal longitudinal fluid flow bore with a transverse port therethrough;

b. valving means in the wall of each valve body shiftable from a first position blocking fluid flow at the port and from the internal bore out of the valve body to a second position for selectively allowing fluid flow to flow from the internal bore laterally out of the wall of the body through the transverse port;

c. an internal sleeve member movable within the bore between the first position, for engaging and shifting the valving means to the second position allowing a portion of the fluid in the internal bore to flow transversely in a generally lateral direction through the port out of the valve body yet allowing fluid flow in the internal bore to continue longitudinally through the valve; and



d. means for maintaining the internal sleeve member in the second position so that fluid flow can continue through the wall of the valve body while simultaneous longitudinal flow continues through the longitudinal bore and the pipe bore.

4,685,521

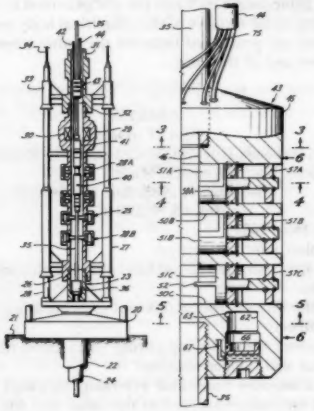
WELL APPARATUS

George M. Raulins, P.O. Box 815746, Dallas, Tex. 75381

Continuation-in-part of Ser. No. 724,171, Apr. 17, 1985. This application Dec. 30, 1985, Ser. No. 814,397

Int. Cl.[4] E21B *43/013*

U.S. Cl. 166—341 **11 Claims**



1. For use performing operations within a subsea well by means of a pipe string which is lowered through a conductor depending from pressure control equipment at the water surface and releasably connected at its lower end to a blowout preventer stack, said string having means for landing upon the head of the well on which the stack is mounted for depending therefrom into the well bore, and means for selectively closing the lower end of the string upon release and raising of the upper end of the string thereabove; a lubricator valve including a body having a bore therethrough connectible as a part of the upper end of the string near the lower and thereof, so that it may be raised and lowered within the bore of the stack,

guideways in the body extending from the bore therethrough, rams slidable in the guideways between positions opening and closing the bore of the body, cylinders in the body, pistons reciprocable in the cylinders and connected to the rams for moving them between opened and closed positions, and means responsive to the supply and exhaust of control fluid from a source at the surface level for causing the pistons to move the rams between opened and closed positions.

4,685,522

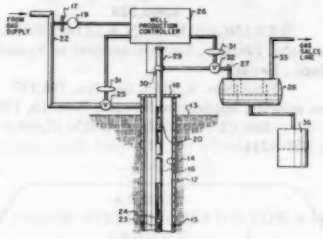
WELL PRODUCTION CONTROLLER SYSTEM

Glenn A. Dixon, The Colony, Tex.; Clark E. McCloskey, Yukon, Okla.; David L. Chambers; Woodrow D. Hawk, both of Garland, Tex., and Oliver W. McCracken, Pauls Valley, Okla., assignors to Otis Engineering Corporation, Dallas, Tex.

Continuation of Ser. No. 557,950, Dec. 5, 1983, Pat. No. 4,633,954. This application Jun. 30, 1986, Ser. No. 880,163

Int. Cl.[4] E21B *34/16*

U.S. Cl. 166—372 **28 Claims**



1. A system for controlling the cyclic operation of a petroleum producing well having a first motor valve connected between a supply of pressurized gas and the well casing and a second motor valve connected between the tubing of the well and a flow sales line comprising:

selectively programmable memory means;

means for storing in said memory signals indicative of a first time period during which pressurized gas is to be injected into the well casing to clear the well of fluids, a second time period durin$_g$ which flow is to be allowed from the well after the fluids are cleared, and a third time period during which the well is to be shut in;

means responsive to the beginning of a cycle for opening both the first and second motor valves simultaneously and beginning said first time period;

means responsive to the expiration of said first time period for closing said first motor valve and beginning said second time period;

means responsive to expiration of said second time period for closing said second motor valve and beginning said third time period; and

means responsive to expiration of said third time period for re-opening said first and second motor valves simultaneously and beginning said first time period.

4,685,523

REMOVABLE SIDE POCKET MANDREL

James H. Paschal, Jr., Dallas, Tex.; Oscar H. Freiman, Anchorage, Ak., and Dickie L. Kernal, Carrollton, Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed May 6, 1986, Ser. No. 860,366

Int. Cl.[4] E21B *23/03*

U.S. Cl. 166—378 **25 Claims**

1. A packoff anchor for bridging a lateral opening in a well flow conductor, comprising:

(a) an elongate tubular body means including a side pocket mandrel having a lateral flow port in its wall and an internal receptacle for removably receiving a device for controlling flow through said lateral flow port, said receptacle being accessible to tools lowered through said well tubing and into said packoff anchor for installing a flow control device therein or removing such device therefrom; and

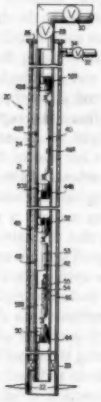
(b) expansible seal means carried on said elongate body means above and below said lateral flow port for sealing with the inner wall of said well flow conductor above and below said lateral opening.

20. The method of preparing a well for gas lift or the like operation, said well having a well casing extending from the surface to a subsurface producing formation and a well tubing inside the well casing and a packer sealing the tubing-casing annulus above said producing formation, said method including the steps of:

(a) lowering a first lock assembly into said well tubing and anchoring it therein at a desired location above said packer;

(b) setting a circulating plug in said well tubing and atop said first lock assembly to be supported thereby;

(c) lowering a tubing perforator into said well, resting said perforator atop said circulating plug, and actuating said perforator to form a perforation through the tubing wall, then retrieving the perforator from the well;



(d) circulating cleanout fluids down said well tubing to said circulating plug, thence outward through said perforation into the tubing-casing annulus, thence up through the tubing-casing annulus to the surface;

(e) retrieving the circulating plug from the well;

(f) lowering a side pocket mandrel having a lateral flow port in its wall and seals above and below its lateral flow port into the well tubing and setting it atop said first lock assembly with its seals sealing between the side pocket mandrel and the well tubing both above and below said perforation;

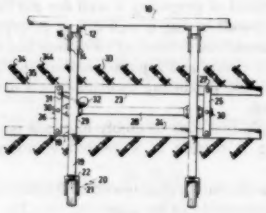
(g) lowering a second lock assembly into said well tubing and setting it atop said side pocket mandrel to secure the same in position with its lateral flow port in communication with said tubing perforation; and

(h) installing a flow control device inside side pocket mandrel to control the admission of lift gas into the tubing from the annulus through said perforation and said lateral flow port.

4,685,524
RECIPROCATING HARROW WITH PARKER

Wilfred G. Williamson, Lethbridge, Canada, assignor to Airmaster Sales Ltd., Winnipeg, Canada

Filed Nov. 19, 1985, Ser. No. 799,504
Int. Cl.[4] A01B *49/02, 23/02, 23/04*
U.S. Cl. 172—54.5 **14 Claims**



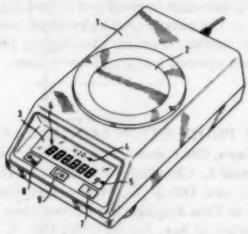
1. A harrow comprising frame means arranged for attachment to transport means whereby the frame means can be moved across the ground in a direction of movement, an elongate support member, means mounting said support member in an orientation such that it extends transversely and is arranged to maintain said support member in said orientation on the frame means at right angles to the direction of motion, a plurality of tine support bars each fixedly mounted on said support member in spaced relation along the elongate support member and each having one end attached to the support member so that an opposed free end thereof extends outwardly from the support member to define a tine supporting section of each tine supporting bar arranged at an angle different from ninety degrees to the support bar and to the direction of motion, and a plurality of spring tines each comprising a flexible coiled spring portion defining an axis around whichit is coiled and arranged for engaging around a respective one of the tine support sections such that the axis of the spring portion lies at said angle of said support section and a tine portion depending downwardly from the spring portion for engaging the ground in a harrowing action including rigid subframe means, a plurality of packer wheels mounted on the subframe means for rolling movement thereof with the subframe in the direction of motion, means mounting the support member on the subframe whereby the harrow tines and packer wheels act on the ground sequentially in the direction of motion, said subframe means including means for attaching said subframe means to said frame means in two different orientations, in one of which said harrow tines act in advance of said packer wheels and in the other of which said harrow tines act rearwardly of said packer wheels.

4,685,525
BALANCE WITH COUNTING SCALE

Erich Knothe, Eddigehausen; Franz-Josef Melcher, Hardegsen, and Christian Oldendorf, Göttingen, all of Fed. Rep. of Germany, assignors to Sartorius GmbH, Fed. Rep. of Germany

Filed Aug. 21, 1986, Ser. No. 898,505
Claims priority, application Fed. Rep. of Germany, Aug. 23, 1985, 3530170
Int. Cl.[4] G01G *19/40, 13/14, 19/00*
U.S. Cl. 177—25 **4 Claims**

1. Balance with counting scale with a tare key (7) for setting the display to zero and with a transfer key (8) which can bring about the transfer of the weight of a certain number of pieces into a memory (16) of the built-in electronic circuitry for determination of the average individual weight, characterized in that a comparator (14) is present in the built-in electronic circuitry which is actuated when the transfer key (8) is pressed and which frees the transfer of the weight into the memory (16) and the determination of the average individual weight when a set threshold is exceeded, while, when this threshold is dropped below, it does not free the transfer of the weight into

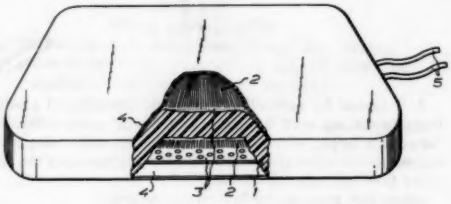


the memory and increases the resolution of the balance by a given factor.

4,685,526
ARRANGEMENT IN A LOAD CELL

Lauri J. Holm, Lidingö , Sweden, assignor to Systemteknik AB, Lindingö , Sweden

Filed Nov. 8, 1985, Ser. No. 796,157
Claims priority, application Sweden, Nov. 23, 1984, 8405931
Int. Cl.[4] G01G *3/14;* **G01N** *15/08*
U.S. Cl. 177—211 **5 Claims**



1. A load cell comprising a core of resilient plastic material, a pair of perforated sheets mounted on opposite sides of said core and having respective strain gages stably attached thereto, the material of said sheets bonding to the material of said core, and a pair of surface layers respectively placed over said sheets, the material of said surface layers bonding to the material of said core.

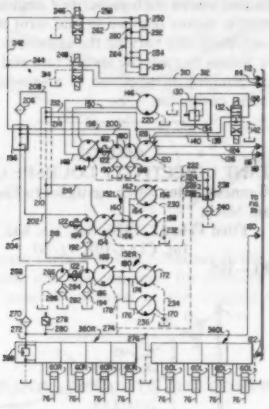
4,685,527
SYSTEM FOR POWERING A TRAILER

Norman D. Oswald, Duncanville; Harry S. Mankey, Dallas; Robert R. Dean, and Dennis W. Hudler, both of Duncanville, all of Tex., assignors to Standard Manufacturing Co., Inc., Dallas, Tex.

Filed Sep. 5, 1985, Ser. No. 772,778
Int. Cl.[4] B62D *59/04*
U.S. Cl. 180—14.3 **12 Claims**

1. A system for powering a trailer comprising:
a trailer frame;
means for connecting the trailer frame to a towing vehicle;
at least one wheel member rotatably mounted on each of opposing sides of the trailer frame for supporting and driving the trailer frame;
at least two hydraulic motors, each for driving at least one wheel member of one of the opposing sides of the trailer frame;
means for supplying pressurized hydraulic fluid from the towing vehicle to the hydraulic motors; and
wherein the hydraulic fluid supply means directs pressurized hydraulic fluid to the hydraulic motors in parallel and without controllinig the flow rate of fluid to the motors, to

facilitate turning the trailer by allowing variation of the flow rate of fluid to the motors and their corresponding



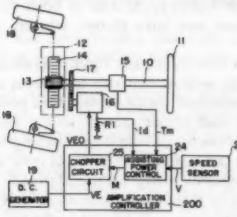
speed during a turn while allowing the motors to provide substantially equal torque to the wheel members.

4,685,528

ELECTRIC POWER STEERING DEVICE FOR A MOTOR VEHICLE

Mikio Suzuki, Hekinan; Shigeo Iwashita, and Masaaki Hayashi, both of Okazaki, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 14, 1986, Ser. No. 839,542
Claims priority, application Japan, Mar. 29, 1985, 60-68051
Int. Cl.[4] B62D *5/04*
U.S. Cl. 180—79.1 **5 Claims**



1. An electric power steering device for a motor vehicle having a steering shaft manually rotatable by a driver, comprising:

a torque sensor for detecting a steering effort applied to the steering column;

a speed sensor for detecting the running speed of said motor vehicle;

an electric motor for generating an assisting power to rotate said steering shaft; and

a control device for controlling the ratio of the assisting power generated by said electric motor to the steering effort detected by said torque sensor so as to vary the assisting power depending upon the detected steering effort, said control device comprising:

ascertaining means for ascertaining whether the vehicle speed detected by said speed sensor is within a low speed range or within a high speed range;

first characteristic control means operable when the vehicle speed is ascertained by said ascertaining means to be within said low speed range, for outputting a first control signal to control the assisting power in accordance with a first characteristic which nonlinearly varies the assisting power with variations in the steering effort in such a manner as to make the increasing rate of the assisting power larger as the vehicle speed decreases;

second characteristic control means operable when the vehicle speed is ascertained by said ascertaining means to be within said high speed range, for outputting a second control signal to control the assisting power in accordance with a second characteristic which is distinctive from said first characteristic with respect to the increasing rate of the assisting power relative to the steering effort and which linearly varies the assisting power with variations in the steering effort in such a manner as to make the increasing rate of the assisting power smaller as the vehicle speed increases; and

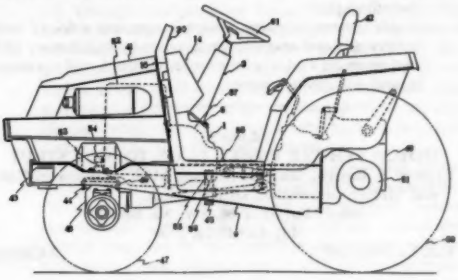
motor drive means responsive to any of said first and second control signals from said first and second control means for driving said electric motor to generate as assisting power which meets said any of said first and second control signals.

4,685,529

HANDLE POST MOUNTING DEVICE FOR TRACTOR

Kazuhisa Tamura; Hideo Watanabe, and Akihiro Shimiza, all of Ehime, Japan, assignors to Iseki & Co. Ltd., Matsuyama, Japan

Filed Apr. 10, 1985, Ser. No. 721,864
Int. Cl.[4] B60D *25/10*
U.S. Cl. 180—89.12 **3 Claims**



1. A handle post mounting device for a vehicle having a bonnet enclosing an engine and a hood (**20**) comprising

a central wall (**1**) having opposed projected portions (**2—2**) formed at the central part thereof directed in a rearward direction whereby an upper portion is positioned forwardly and a lower portion directed rearwardly to define forwardly tilted housing, adapted to connect with the hood (**20**),

sealing means circumscribing the peripheral portions of the central wall, for sealing the connection between said central wall and the hood (**2**),

a body frame (**9**), and

means (**10**) connected to said central wall (**1**) for mounting said central wall on said body frame (**9**) at the rear of the bonnet, whereby said central wall (**1**) covers the upper part of a clutch housing by a lower portion of said central wall (**1**),

and a handle part (**7**) mounted through said central wall.

4,685,530
SIDE COVER STRUCTURE FOR MOTORCYCLES

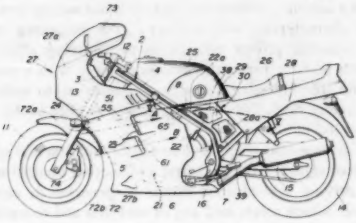
Kunitaka Hara, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 13, 1985, Ser. No. 775,961

Claims priority, application Japan, Sep. 14, 1984, 59-139753[U]

Int. Cl.⁴ B60K *11/08*; B62J *17/00*

U.S. Cl. 180—219 **6 Claims**



1. A side cover and cowl structure in a motorcycle having a motorcycle frame having a head pipe, laterally spaced side pipes, a seat pipe and a rear pipe, an engine having cylinders, said engine and said cylinders being disposed between said spaced side pipes, a fuel tank supported on said frame, a driver's seat disposed on said frame, said engine being supported on said frame below said fuel tank and said driver's seat, a battery and an engine-cooling system associated with said engine, said engine-cooling system including a radiator and a reservoir tank for a cooling liquid, said battery and said reservoir tank being supported on said frame below said driver's seat and behind said engine, said side cover and cowl structure comprising:

side cover members attached to said frame over said laterally spaced side pipes and under side driver's seat;

said side cover members partially covering the sides of said cylinder and having an opening for permitting air to flow therethrough;

said side covers members covering opposite sides of said battery and said reservoir tank, whereby said battery and said reservoir tank can be checked through said openings in said side cover members.

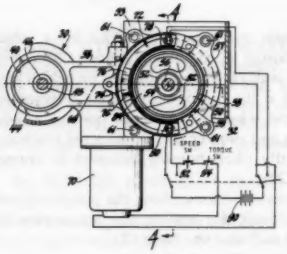
4,685,531
MOTOR VEHICLE POWER TRAIN TORQUE STRUT

Leonard F. Kopich, Madison Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Mar. 31, 1986, Ser. No. 846,557

Int. Cl.⁴ B60K *5/04*

U.S. Cl. 180—300 **2 Claims**



1. In a vehicle having a transversely mounted power train elastomeric mount means supporting said power train on said vehicle, and torque strut means pivotally connected about pivot axes at opposite ends thereof to said power train and vehicle for controlling pitching of said power train, the improvement comprising said torque strut means having elastomeric means at one of said end connections having a configuration such as to effect a spring rate acting longitudinally of said strut means that varies with prescribed angular positioning of said elastomeric means relative to said strut means, and drive means for automatically varying the angular positioning of said elastomeric means to vary the spring rate and thereby control power train pitching in response to a sensed varying power train operating condition.

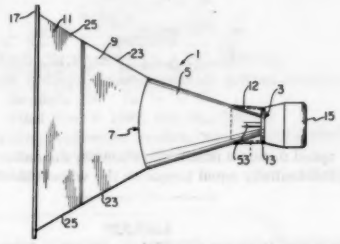
4,685,532
CONSTANT DIRECTIVITY LOUDSPEAKER HORN

David W. Gunness, Niles, Mich., assignor to Electro-Voice, Inc., Buchanan, Mich.

Filed Feb. 21, 1986, Ser. No. 832,155

Int. Cl.⁴ G10K *11/00*

U.S. Cl. 181—185 **15 Claims**



1. In a high-frequency, constant-directivity loudspeaker horn including a relatively large-throat driver transducer coupled to a circular entry opening of similar diameter at an initial throat section of said horn, where said throat section terminates in a rectangular slot-like exit opening having a width substantially less than the throat entry diameter, an improvement for avoiding undesirable acoustic effects resulting both in interference causing a drop-out or reduced response at particular frequencies, and in "beaming" or narrowing of the beam width at high frequencies, due to both the relatively large diameter driver and horn throat, wherein the improvement comprises:

beamwidth control means rigidly mounted wholly within said throat section, between said throat entry opening and a predetermined throat termination point, for effectively dividing said throat section into a plurality of smaller psuedo horns for directing and shaping the acoustic wavefronts to said termination point, beyond which the individual wavefronts exiting from said psuedo horns mix within said horn to form a coherent wavefront substantially free from interference and beaming effects;

said throat section forming a smooth transition from its circular entry opening to its rectangular exit opening via successively increased flattening of its cross-section in one dimension, and stretching of its cross section in another dimension perpendicular to the one dimension.

4,685,533
EXHAUST DISSIPATOR DEVICE

Edward T. Piesik, Pomona, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Dec. 27, 1985, Ser. No. 814,139

Int. Cl.⁴ F02K *1/44*

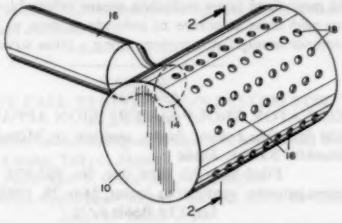
U.S. Cl. 181—213 **7 Claims**

1. An exhaust dissipator device for connection to a rocket exhaust, comprising:

a container of elongate shape having a unique central longitudinal axis and defining an enclosed chamber having an inlet at an intermediate point in the length of the container for connection to a rocket exhaust to direct rocket exhaust flow into the container in a direction transverse to the

central longitudinal axis of the container and a plurality of exhaust orifices spaced around the container for exhaust flow out of the container;

each orifice comprising a tapered nozzle of area increasing outwardly from the interior of the container; and



a solid deflector surface in said container in the direction of exhaust flow into the container for deflecting flow in a direction generally normal to the original exhast flow direction.

4,685,534

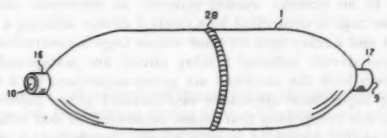
METHOD AND APPARATUS FOR CONTROL OF FLUIDS

A. Lincoln Burstein, and Roy Burstein, both of Box 608, 1810 Rittenhouse Sq., Philadelphia, Pa. 19103

Continuation-in-part of Ser. No. 523,709, Aug. 16, 1983, abandoned. This application Jan. 8, 1985, Ser. No. 689,647

Int. Cl.[4] F01N *1/02*

U.S. Cl. 181—251 **19 Claims**



1. A method for controlling flow of fluid, said method comprising:

(a) separating and apportioning said fluid into a primary stream, at least one secondary stream and an accelerated jetstream;

(b) the primary stream being centrally positioned, the secondary stream and the jetstream having substantially co-axial and concentric fields of flow with respect to the primary stream and with each other;

(c) the secondary stream being formed by separating successively downstream-flowing peripheral portions of the primary stream, the separating portions diverging from and enveloping said primary stream;

(d) accelerating peripheral portions of the diverging secondary stream to flow faster than the primary stream;

(e) the jetstream being formed by blending successively downstream-flowing said accelerating peripheral portions of the secondary stream, the jetstream annularly surrounding said secondary stream and having continuous, laminar, downstream flow;

(f) the jetstream peripherally and tangentially transiting successively downstream peripheral portions of the secondary stream and so entraining said portions of said secondary stream;

(g) the entraining secondary stream continuously augmenting mass and amplifying velocity of the transiting jetstream, causing the jetstream to flow cumulatively faster than said secondary stream;

(h) recombining downstream the separated primary stream, secondary stream and jetstream, to form a tangentially accelerated, unified stream;

(i) each of the said streams having a non-reversing, substantially axial unitary flow direction, unimpeded, non-turbulent flow and continuously inter-exchanging fluid-pressure in common with the other said streams.

9. A fluid control device, comprising:

(a) an axially-extending, unobstructed and unimpeded open and straight-through, fluid permeable, centrally, concentrically and co-axially disposed, smoothly and projectionlessly surfaced, substantially tubular main channel for fluid conduction, the said main channel having an unreducing and substantially constant diameter and having a plurality of individually streamlined, fluid-contact-leading-edge-rounded and unitary-flow-direction-angled fluid-permeable opening means for insuring a peripheral portion of fluid travelling within the said channel to nonturbulently escape and expand from the said channel, the said channel and opening means having proportions and diameters modifiable in manufacture to allow individualized application of the said device to fluid substances having varied physical properties, and the said channel having a portion of its axial length imperforate and extending through and from an intake end of the said device, forming an intake bushing for attachment to a source of fluid flow, the said bushing being modifiable in proportion with the said channel and for the same purpose;

(b) a series of fluid conductor/deflector means, each having substantially truncated frusto-conical configuration and being posited successively downstream from one another so that a base of a frustum of one cone fits over an apex of a frustum of a next successively downstream cone, having transverse surfaces of compound reversing parabolic sine-wavelike curvature, being concavo-convex upon an outer transverse surface of one and convexo-concave upon an inner transverse surface, on a line taken from apex to base of any cone, the said conductor/deflector means being attached at their apexes to and diverging from the said main channel at a substantially downstream-angled pitch with respect to a longitudinal axis of the said main channel, whereby fluid escaping from the said main channel is directed against the convex surface of a cone, deflected and conducted to expand toward a radially outer periphery through sine-wavelike circumferentially expanding flow and discharged at the said periphery of each cone in a downstreamly axial direction, and proportions of each geometric spatial unit of the said conductor/deflector means, diameters of the apexes and bases of the said cones and angles of pitch with respect to the axis of the said main channel being variable in manufacture to fit varied applications and various fluid physical properties;

(c) an imperforate, substantially cylindrical housing, enclosing the said main channel and conductor/deflector means, the said housing having an enlarged, elongate, tubular intermediate center section and having end-closure formed from and by two curvilinearly tapered and sections having compoundly curved walls narrowing from a diameter of the said center section through a reversing double-parabolic curvature to form end walls having a truncated substantially bottleneck configuration at each end of the said housing, the said end sections having each an opening centrally posited with respect to a cross-sectional diameter of the said housing and co-axially aligned with one another and with the longitudinal axes of the said main channel and the said housing, an inlet-end opening snugly fitting, affixing and sealing with an outside diameter of the said imperforate intake bushing portion of the said main channel, an an outlet-end section integrally forming a outlet channel from an outlet-end section end wall by extending on tubular portion of the outlet-end said bottleneck configuration, the said tubular portion having an integral surface curvilinearly integral with that of the said housing to insure non-turbulent exit-flow, an external surface of the said outlet-end tubular portion serving as an outlet-end bushing for connection to an indefinitely extending outlet means, such as an exhaust pipe, or the said tubular portion may remain without connections as an

outlet conduction channel, and an inner surface of said housing being in sufficiently close approach with peripherally outermost curved surfaces and trailing edges of the said conductor/deflector means to form a series of curvilinearly narrowing restrictive annular openings between the said inner housing outer deflector surfaces and to force a marked acceleration of flow in fluid passing therethrough, and said openings so angled as to cause downstreamly axial directional discharge, whereby forming a closely limiting boundary-layer jetstream-space wherein the said housing defines the outermost course of the said expanding fluid;

(d) the said device having no practical large or small size limitations and proportions remaining variable in manufacture according to fluid substance viscous resistance, shear stress and other characteristics of individual fluid substance dynamics and being variable in proportions with regard to the said restrictive openings, to accommodate varying physical properties of different flowing subdivided solid particles flowing through the said device and for varying types of applications of the said apparatus;

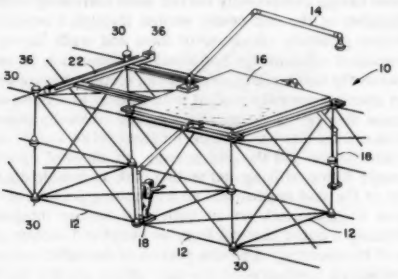
(e) all internal fluid-substance-contacting surfaces, corners, porosities, perforations, edges and fluid conducting or deflecting means are formed, treated, angled and smoothed so as to have no scooping surfaces, forms or edges and no sufficiently blunted, sharp or projecting edges, shoulders, surface roughnesses or planes opposed to, at obstructively oblique angles or so angled as to obtrude into or intersect a unitary path of substantially axially directed, non-turbulent flow at any micro-stage of entire flow-process within the said device which could cause bluff-body effects, leading-edge shock-wavefronts, fluid cavitation, projective and surface-skin fluid-frictions or boundary-layering, and the said treatment being a means to eliminate turbulence and/or acoustical frequencies altering an intended free, smooth and noiseless flow of fluid substances upon encounter with the said surfaces of the said device at operant velocities and pressures of fluid flow, and all angles, proportions, openings and slopes are stream-liningly adjusted in manufacturing to optimum computations for specific applications and specific fluid properties and characteristics.

4,685,535

MOBILE REMOTE MANIPULATOR VEHICLE SYSTEM

Harold G. Bush, Yorktown; Martin M. Mikulas, Jr., Poquoson; Richard E. Wallsom, Newport News, and J. Kermit Jensen, Hayes, all of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 31, 1985, Ser. No. 760,799
Int. Cl.[4] E04G *3/10*
U.S. Cl. 182—63 **14 Claims**



1. A mobile remote manipulator system providing an assembly and logistics platform adapted for translation about large square bay truss structures, comprising in combination:

a moveable track layer adapted for releasable attachment to a truss structure,

a logistics platform in operative spaced engagement with said track layer,

an intermediate motorized layer rotatably disposed between and in operative engagement with said track layer and said logistics platform layer,

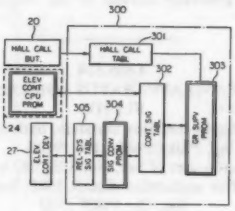
said motorized layer including means releasably, attachable to said truss structure to provide motion to said mobile remote manipulator system along a truss structure.

4,685,536

ELEVATOR GROUP SUPERVISION APPARATUS

Youichi Ichioka, Tokyo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed May 22, 1986, Ser. No. 865,972
Claims priority, application Japan, May 28, 1985, 60-114619
Int. Cl.[4] B66B *1/16*
U.S. Cl. 187—101 **8 Claims**



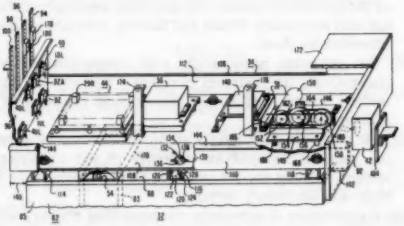
1. In an elevator system wherein an electronic elevator whose cage is controlled by a control device utilizing a computer and a relay type elevator whose cage is controlled by a control device utilizing a relay circuit are juxtaposed, and wherein both the elevators are group-supervised by a single group supervision apparatus, said elevator group supervision apparatus comprising first means connected to said relay circuit control device to transfer signals therebetween, second means electronically connected to said computer-based control device to transfer signals therebetween, and a group-supervisory computer receiving hall call signals, a status signal from said relay circuit control device, and a status signal from said computer-based control device to collectively group-supervise said elevators.

4,685,537

ELEVATOR SYSTEM WHICH UTILIZES BOTH RIGID AND RESILIENT MOUNTING ARRANGMENTS FOR DOOR OPERATOR

George A. Kappenhagen, Stroud Township, Monroe County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 4, 1986, Ser. No. 892,975
Int. Cl.[4] B66B *13/00*
U.S. Cl. 187—103 **8 Claims**



1. An elevator system, comprising:

a building having an elevator hatchway,

an elevator car mounted for movement in said hatchway,

said elevator car including a canopy, a door having at least one panel, and door operator means mounted on said canopy for operating said door,

said door operator means including an enclosure, means rigidly fixing said enclosure to said canopy, a drive assembly, and means resiliently mounting said drive assembly within said enclosure.

4,685,538

REMOTE CALL REGISTRATION SYSTEM FOR ELEVATOR

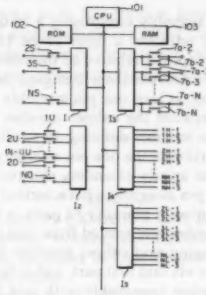
Hiroshi Kamaike, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1986, Ser. No. 849,949

Claims priority, application Japan, Apr. 10, 1985, 60-75880

Int. Cl.[4] B66B *1/14*

U.S. Cl. 187—121 **7 Claims**



3. A remote call registration system for an elevator comprising a portable transmitting device to be carried by a user of the elevator, a receiving device disposed at a position near to but spaced a distance from a hall of the elevator in a passageway leading to the hall to receive a signal transmitted from said transmitting device operated when the user is at a given walking distance from the elevator hall, and call registration means to register a call prior to arrival of the user at the elevator hall responsive to said receiving device receiving the transmitted signal to reduce the waiting time when the user has arrived at the elevator hall, said call registration means registering a destination hall and a hall call in response to said receiving device receiving the transmittal signal.

4,685,539

OPERATING SYSTEM FOR ELEVATOR

Shintaro Tsuji, and Yasukazu Umeda, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1986, Ser. No. 879,958

Claims priority, application Japan, Jul. 4, 1985, 60-147108

Int. Cl.[4] B66B *1/20*

U.S. Cl. 187—126 **8 Claims**

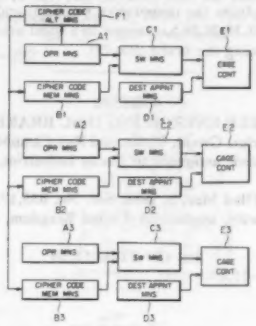
1. In an operating system for an elevator wherein operation means are disposed in correspondence with a plurality of cages, cipher code memory means to store predetermined operating sequences of the operation means beforehand are disposed in correspondence with the respective cages, and switching means are disposed to compare operating sequences of the corresponding operation means with the predetermined sequences stored in the cipher code memory means when the operation means are operated and to switch the corresponding cages to predetermined runs when both the operating sequences agree;

an operating system for an elevator characterized by comprising:

(a) a cipher code revising switch which generates a signal for revising the operating sequences,

(b) operation buttons which generate signals for setting the operating sequences, and

(c) cipher code alteration means to receive and store the new



operating sequence setting signals based on said operation buttons, in response to the revision signal from said cipher code revising switch, and to supply the new operating sequences to the respective cipher code memory means disposed in correspondence with the cages, thereby to alter the stored contents of the operating sequences.

4,685,540

SIGNAL TRANSMITTER FOR MONITORING A BRAKE LINING

Heinrich B. Rath, Vallendar, and Winfried Schemmel, Emmelshausen, both of Fed. Rep. of Germany, assignors to Lucas Industries public limited company, Birmingham, England

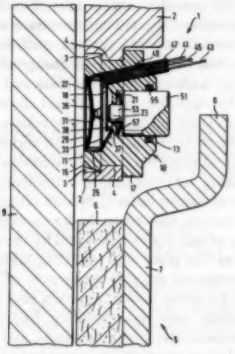
PCT No. PCT/EP85/00253, § 371 Date Jan. 28, 1986, § 102(e) Date Jan. 28, 1986, PCT Pub. No. WO85/05662, PCT Pub. Date Dec. 19, 1985

PCT Filed May 24, 1985, Ser. No. 826,488

Claims priority, application Fed. Rep. of Germany, Jun. 5, 1984, 8417127[U]; Feb. 12, 1985, 8503812[U]

Int. Cl.[4] F16D *66/00*

U.S. Cl. 188—1.11 **8 Claims**



1. A signal transmitter for monitoring a brake lining, especially in a disc brake for motor vehicles, comprising a casing (10) which, when installed, is positioned opposite a brake member (8;9;44) at decreasing spacing as the wear of the breake lining (6) progresses and which contains electrical contacts (31,35,37,39;28,38) and leads (41,43, 45;30,32) the

switching states of which are adapted to be changed at certain wear and/or heating of the brake lining (6), a plug (51;20) guided in the casing (10) for displacement from an inoperative position in parallel with the direction of wear of the brake lining (6) and adapted to be pressed further into the casing (10) by the brake member (8;9–44) and, in a terminal position, holds at least one of the contacts (37;28) in a switching position which differs from the inoperative position, and a heat sensitive switch (31,35;28,38,) arranged in a front area of the signal transmitter facing the brake disc (9).

4,685,541

SELF-ENERGIZING DISC BRAKES

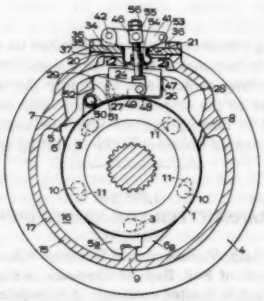
Anthony G. Price, Gwent, Wales, and Roy Campbell, Worcestershire, England, assignors to Lucas Industries, Birmingham, England

Filed Mar. 3, 1986, Ser. No. 835,172

Claims priority, application United Kingdom, Mar. 9, 1985, 8506164

Int. Cl.[4] F16D *55/04*

U.S. Cl. 188—71.4 **20 Claims**



1. A self-energising disc brake comprising a housing having a radial bore, first and second axially spaced braking surface in said housing, radial pilot lugs and a drag-taking stop abutment in said housing, first and second pressure plates centred on said pilot lugs, adjacent faces of said pressure plates being provided with co-operating oppositely inclined angularly spaced recesses, actuator lugs provided on said pressure plates, rolling bodies located in complementary pairs of said recesses, a rotatable friction member disposed between each said pressure plate and an adjacent said braking surface, each said member comprising a disc, and first and second linings of friction material for engagement with said pressure plate and said braking surface carried by opposite faces of said discs, and means for moving said pressure plates angularly relative to said housing to initiate application of said brake with said presure plates also moving axially to urge the friction members into engagement with said braking surfaces due to a tendency for said rolling bodies to ride up ramps defined by said recesses and constituting camming means, said plates being carried round with said discs until one of said plates is arrested by the engagement of an arresting lug on that plate with said drag-taking stop abutment, whereafter continued angular movement of the other of said plates provides a servo action, wherein said brake is provided with an actuator unit incorporating hydraulically-operable means and mechanically-operable means, and wherein said unit comprises a closure plate which is secured to said housing said closure plate having radially inner and outer faces and from one face of which a spigot extends radially inwards through said radial bore into the space defined by said housing, said spigot carrying at its radially inner end a cylinder body having a longitudinal bore of which the axis is tangential to the pressure plates, and at least one piston for co-operation with one of said actuator lugs working in said bore, and wherein said mechanically operable means is mounted on the other face of said closure plate.

4,685,542

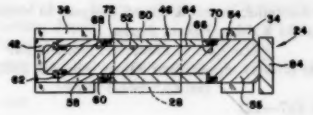
DISC BRAKE ASSEMBLY

James J. Colpaert, Granger, Ind., assignor to Allied Corporation, Morristown, N.J.

Filed Nov. 23, 1981, Ser. No. 323,841

Int. Cl.[4] F16D *55/22*

U.S. Cl. 188—72.3 **2 Claims**



1. A disc brake assembly comprising a torque member disposed substantially adjacent a rotor to be braked, a caliper member movably disposed relative to the rotor and cooperating with a pair of friction elements to engage the latter with the rotor during braking, at least one pin assembly forming a movable connection between the caliper member and the torque member, the torque member defining an axially extending slot receiving a first portion of the one pin assembly and the caliper member defining an axially extending slot receiving a second portion of the one pin assembly, characterized in that said one pin assembly comprises a plurality of parts, a first part engaging said torque member and spaced from said caliper member, a second part engaging said caliper member and spaced from said torque member via said first part, and a third part comprising a resilient member engageable with said first and second parts to resist movement of said first and second parts away from a rest position, said first and second parts defining a spacing in the rest position and said first and second parts being moveable during braking to take up the spacing, said resilient member biasing said first and second parts to move upon termination of braking such that the spacing is reestablished between said first and second parts, said second part directly abutting one of said pair of friction elements whereby said one friction element is moved directly with said second part to a position slightly away from the rotor upon termination of braking, said first part comprising a cylindrical sleeve and said second part includes a recess extending between shoulders for movably receiving said cylindrical sleeve, said cylindrical sleeve being normally spaced from one of said shoulders by said resilient member.

4,685,543

SUPPORT PLATE FOR A FRICTION LINING OF A DISC BRAKE

Jürgen Ziolkowski, Reinbek, Fed. Rep. of Germany, assignor to Jurid Werke, Fed. Rep. of Germany

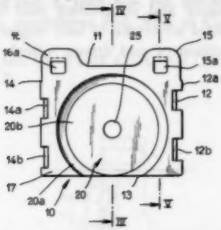
Continuation of Ser. No. 717,466, Mar. 27, 1985, abandoned, which is a continuation-in-part of Ser. No. 462,294, Jan. 31, 1983, abandoned. This application May 14, 1986, Ser. No. 865,634

Int. Cl.[4] F16D *65/00, 65/78, 69/00*

U.S. Cl. 188—73.1 **4 Claims**

1. A backing plate for a friction lining of a disc brake assembly, said backing plate having a substantially rectangular shape with fixing brackets formed on an upper rim, said friction lining on engagement with another member during a brake application generating thermal energy and creating vibrations, said backing plate being characterized by a base member with substantially constant thin wall thickness, said base member having a crimped recessed portion with a circular shape, said recessed portion being offset from said base member, said friction lining being located in said recessed portion and aligned therein by tabs that extend from at least first and second sides of the base member, said disc brake assembly having

an actuation member that engages said recessed portion to effect a brake application, said recessed portion holding said base member from said actuation member to define an air gap therebetween, said friction lining conducting heat produced during said brake application to said backing plate, said air gap dispersing a substantial portion of said heat prior to the heat



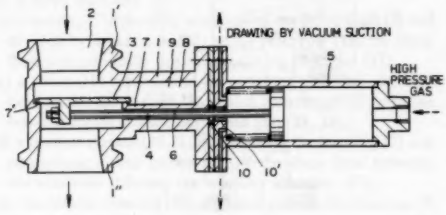
being conducted to said recessed portion to reduce the transfer to thermal energy from the friction lining to the actuation member which would adversely effect the operation thereof while said circular shape of the recessed portion absorbs vibrations to reduce the development of noise during a brake application.

4,685,544

SLIDING EXHAUST GAS BRAKE

Kazunori Takigawa, Numazu, and Ryoichi Suzuki, Mishima, both of Japan, assignors to Usui Kokusai Sangyo Kabushiki Kaisha, Sunto, Japan

Filed Mar. 27, 1986, Ser. No. 844,987
Int. Cl.[4] F02D 9/06
U.S. Cl. 188—273 **4 Claims**



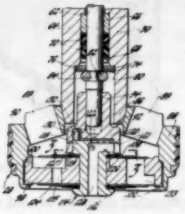
1. In a sliding exhaust gas brake comprising a housing having a portion defining an exhaust gas passage having opposed upstream and downstream ends and connected to an exhaust pipe in a motor vehicle at both said ends thereof and a portion connected to said passage substantially at right angles thereto and defining a chamber in which a valve member is slidably disposed, and a valve actuator having one end connected to a housing wall defining the end of said chamber, said actuator including a piston and a piston rod extending into said housing through said housing wall and having one end on which said valve member is supported, the improvement which comprises a partition provided in said housing for dividing said chamber into an upstream portion in which said valve member is slidably disposed and a downstream portion into which said piston rod extends, said partition having an opening aligned with said passage, said opening having an edge defining a valve seat on which said valve member rests when closing said passage, said valve member being slidable on said partition and received into said upstream portion when opening said passage, said upstream portion being fluidally connected with said passage upstream of said opening.

4,685,545

HYDRAULIC DAMPER FOR VEHICLES WITH VARIABLE ORIFICE PISTON VALVING FOR VARYING DAMPING FORCE

Wayne V. Fannin, Xenia, and Harry C. Buchanan, Jr., Spring Valley, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 685,806, Dec. 24, 1984, abandoned. This application Jul. 31, 1986, Ser. No. 892,742
Int. Cl.[4] F16F 9/46, 9/48
U.S. Cl. 188—299 **6 Claims**



1. A hydraulic damping unit for controlling the spring action of vehicle suspension springs comprising a cylinder tube having a hydraulic fluid therein, a valved piston having a generally cylindrical body mounted for linear stroking movement in said cylinder tube and hydraulically separating said cylinder tube into first and second chambers, valve means within said body of said piston for controlling the flow of hydraulic fluid between said chambers through said piston, a piston rod connected directly to said body of said piston and extending to the exterior of said damping unit, a rotatable actuator operatively mounted in said piston rod, said valve means comprising an orifice plate fixed within said body of said piston having a plurality of hydraulic fluid flow controlling orifices therethrough, first and second deflectable spring disk means mounted on opposite sides of said orifice plate operatively associated with said orifices providing primary control of the damping force of said unit, fastener means extending through said orifice plate and said first and second disk means within the body of said piston, a plurality of separate and varying size fluid flow passages extended through said fastener means in parallel with said orifices, said fastener means having a head portion within said body of said piston, a selector plate rotatably mounted on said head portion and having a selector opening therein selectively registrable with any of said passages, means operatively connecting said selector plate to said actuator for rotation thereby so that any of said fluid flow passages can be selected for varying the damping action of said unit.

4,685,546

AUXILIARY CARRYING CASE FOR LUGGAGE

Brian D. Sadow, 21 Pondhill Rd., Chappaqua, N.Y. 10514

Filed Aug. 1, 1986, Ser. No. 892,510
Int. Cl.[4] A45C 3/00, 13/00
U.S. Cl. 190—102 **3 Claims**

1. An auxiliary carrying case, comprising:

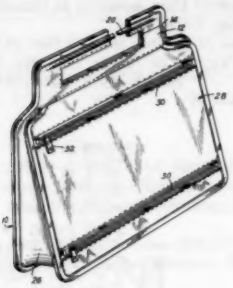
a substantially rectangular planar rear wall formed from a flexible material;

an elongate substantially rectangular upward continuation of said rear wall having an elongate aperture of a size in excess of the width and length of a conventional carrying handle of an article of luggage;

a reinforcing rod affixed to said upward continuation and extending longitudinally thereof at that side of said elongate aperture that is remote from said rear wall, said reinforcing rod being of an axial length at least equal to the length of said aperture; and,

pouch means attached to a front face of said rear wall, said rear wall providing the sole support for said pouch means,

and including a front wall substantially coextensive with said rear wall, and which is connected to said rear wall by gussets along three of its edges, the fourth edge of said



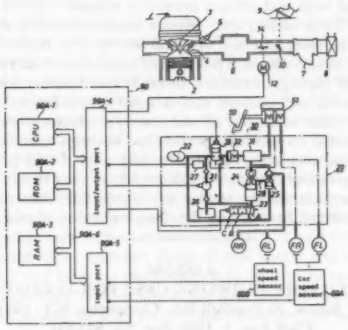
wall being connected directly to said rear wall and to said upward continuation further including access openings in said front wall, and closure means for said access openings.

4,685,547

WHEEL SLIP CONTROLLING SYSTEM

Kaoru Ohashi; Ikuya Kobayashi, both of Okazaki; Takahiro Nogami, Toyota; Akira Shirai, Toyoake; Kazumasa Nakamura, Okazaki, and Yoshihisa Nomura, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Oct. 23, 1985, Ser. No. 790,452
Claims priority, application Japan, Oct. 30, 1984, 59-228538
Int. Cl.[4] B60K *41/20*
U.S. Cl. 192—3 R **8 Claims**



1. A wheel slip controlling system, comprising:

braking means operable by a driver of a car for applying a braking pressure to driven wheels of said car;

slip detecting means for detecting a slipping condition of said driven wheels and outputting a slip signal indicative of said slipping condition;

anti-skid control means responsive to said slip signal for controlling said braking pressure applied by said braking means;

acceleration means operable by said driver of said car for controlling a rate of rotation of said driven wheels;

a first throttle valve placed in an air intake path of an internal combustion engine of said car, said first throttle valve being controlled by said acceleration means;

a second throttle valve placed in said air intake path of said internal combustion engine; and

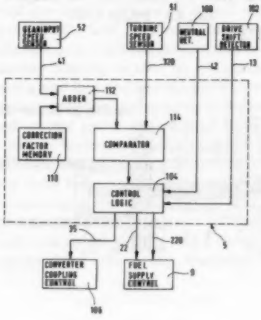
traction control means responsive to said slip signal outputted from said slip detecting means when said acceleration means is actuated, said traction control means controlling the rate of rotation of said driven wheels by varying said braking pressure and controlling said second throttle valve to control air intake of said engine such that said slipping condition of said driven wheels is substantially reduced.

4,685,548

CONTROL SYSTEM FOR SPEED SYNCHRONIZED CLUTCH OPERATION DURING GEAR SHIFT OF ENGINE DRIVEN TRANSMISSION

Otto Holtermann, Langenargen; Klaus Torbusch, Ahausen, and Gerold Bieber, Langenargen, all of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen, AG, Friedrichshafen, Fed. Rep. of Germany

PCT No. PCT/EP85/00555, § 371 Date Jun. 18, 1986, § 102(e) Date Jun. 18, 1986, PCT Pub. No. WO86/02604, PCT Pub. Date May 9, 1986
PCT Filed Oct. 21, 1985, Ser. No. 876,861
Int. Cl.[4] B60K *41/28*
U.S. Cl. 192—0.08 **23 Claims**



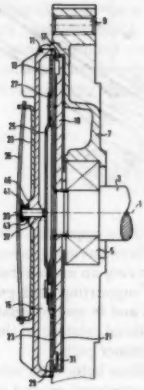
1. In combination with an engine (**2**) having a speed controlling device (**7, 9**) for varying engine speed, a gear unit (**4**), a clutch (**1**) having coupling elements (**11, 12**) respectively coupled to the engine and the gear unit, means (**106**) for controlling engagement of the coupling elements of the clutch to drivingly interconnect the engine and the gear unit and gear shift means (**6**) operatively connected to the gear unit for change in drive ratio thereof, the improvement comprising control means (**5**) operatively connected to the speed controlling device for operation thereof in a speed synchronizing mode affecting relative rotation of the coupling elements, means (**100, 102**) opertively connecting the gear shift means to the control means for initiating said speed synchronizing mode of operation of the speed controlling device in response to said change in drive ratio of the gear unit and a pair of speed sensing devices (**51, 52**) for respectively measuring the rotational speeds of the coupling elements, said control means including comparing of means connected to the sensing devices for determining drive condition as a function of the measured rotational speeds of the coupling elements.

4,685,549

TEMPERATURE-DEPENDENTLY CONTROLLABLE FLUID FRICTION CLUTCH

Gerd Brunken, Dittelbrunn; Werner Göb, Kürnach, and Oswald Reis, Gädheim, all of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Dec. 6, 1985, Ser. No. 805,973
Claims priority, application Fed. Rep. of Germany, Dec. 8, 1984, 3444928
Int. Cl.[4] F16D *35/00, 43/75*
U.S. Cl. 192—58 B 8 Claims



1. A temperature-dependently controllable fluid friction clutch, comprising

(a) a drive shaft (3),

(b) a housing (7) rotatably mounted on the drive shaft (3) and divided by a partition (13) into a reservoir (15) for shear fluid and an axially adjacent working chamber (17),

(c) a rotor (19) arranged in the working chamber (17) and held on the drive shaft (3), which rotor together with the housing forms at least one shear gap (21, 23),

(d) a control device (25,27,29,31) within the housing (7) and controlling a flow circulation of the shear fluid between the reservoir (15) and the working chamber (17),

(e) a bimetallic element (35) arranged outside the housing (7) on an end wall (11) of the housing extending transversely of the drive shaft (3),

(f) an axially extending pin (39) coupling the bimetallic element (35) with the control device (25,27,29,31) and being axially displaceable in an opening (37) of the end wall (11), as pin (39) having one end located outside the housing (7) and being movably away from the end wall (11) for engagement of the clutch and towards the end wall (11) for disengagement of the clutch,

(g) a sealing element (41,41*a*,41*b*) of elastic material annularly enclosing the pin

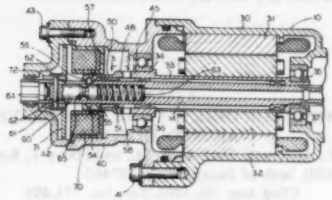
wherein the sealing element being held in sealed manner on a part of the pin (39) protruding from the housing (7), said element comprising a sealing flange (43,51,61) of substantially annular elastic disc form having an annular outer peripheral edge (53,65) which protrudes to the end wall (11) and rests in sealed manner under axial stress on an outer sealing surface (45) of the end wall (11), extending perpendicularly of the path of displacement of the pin (39), at least in a partial zone of the displacement path of the pin, and the outer peripheral edge (53,65) being unattached to the sealing surface so as to be capable of lifting off the sealing surface (45).

4,685,550

QUICK DISCONNECT MECHANISM

Jeffrey D. Metcalf, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Sep. 26, 1985, Ser. No. 780,678
Int. Cl.[4] F16D *11/10*
U.S. Cl. 192—67 R 2 Claims



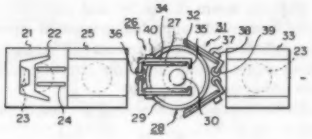
1. A quick-disconnect mechanism for disconnecting rotatable driving and driven elements when the driving element cannot rotate and the driven element is back driven comprising, a shaft defining the driven element, a tubular member surrounding the shaft and defining the driving element, a recess at an end of said shaft, a ball slot in a shaft wall surrounding said recess, a ball in said slot having a diameter greater than the thickness of said wall, a lock member movably guided in said recess for limited movement lengthwise of said shaft and having a ball relief slot, a sleeve surrounding said wall and splined to said shaft for movement lengthwise thereof and rotation therewith, a tapered jaw clutch connecting said sleeve to said tubular member, a pair of ball relief slots formed interiorly of said sleeve and spaced lengthwise thereof for alternate coaction with said ball, and means for positioning said lock member in either a release position with the ball relief slot of the lock member aligned with said ball slot or a locking position with the ball relief slot of the member out of the alignment with the ball slot, one of said pair of ball reliefs slots in said sleeve coacting with the ball in the ball slot to hold the tapered jaw clutch engaged and the other of said pair of ball relief slots coacting with the ball in the ball slot to hold the jaw clutch disengaged.

4,685,551

DELIVERY APPARATUS

Yoshinobu Ono, Tokyo, and Yoshio Watanabe, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

Filed Aug. 20, 1985, Ser. No. 767,466
Claims priority, application Japan, Aug. 31, 1984, 59-181968
Int. Cl.[4] B65G *47/00*
U.S. Cl. 198—346.2 4 Claims



1. A delivery apparatus comprising: delivery means including a pair of delivery belts substantially parallel to each other during conveying of an article and supporting members for supporting said delivery belts, said delivery means being movable between a closed position where the paired delivery belts are parallel to each other and an open position where the paired delivery belts are in an open-leg shape; a pivot means by which leading ends of each of said paired delivery belts are pivoted outwardly about pivot points in the region of trailing

ends of said supporting members so that each of the leading ends of said delivery belts diverges outwardly to said open position; and a delivery station disposed between said paired delivery belts at the leading ends thereof, wherein the article is transferred between the delivery station and the delivery belts when the delivery belts are in the closed position, and a treatment of the article placed on the delivery station is conducted when the delivery belts are in the open position.

4,685,552

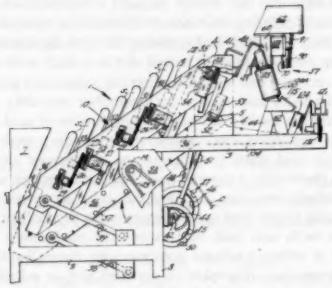
MACHINE FOR ORIENTATING AND DELIVERING TAPERED ARTICLES

Ronald L. Anderson, 3641 Agate St., and Harry T. Kessler, Jr., 4460 Mill, both of Eugene, Oreg. 97405

Filed Aug. 30, 1985, Ser. No. 771,498

Int. Cl.[4] B65G *47/24*

U.S. Cl. 198—389 **24 Claims**



12. In combination,

conveyor means for the lateral discharge of elongate tapered articles,

article orientating means receiving the articles and having opposed horizontally spaced apart components between which the articles pass, said components retarding the downward passage of the larger end of the elongate tapered article to incline the major axis of the article, said article orientating means including an oscillating flexible plate structure having upright and inclined sections, means acting on said plate structure and imparting horizontal oscillating motion thereto, a continuously moving surface subjacent said plate structure and moving in a direction transverse to a projected downward course of the article and serving to displace the lowermost end of the article in said direction, and

article aligning means driven by said conveyor means and serving to mutually align like orientated tapered articles received from said article orientating means, said article aligning means having an article arresting surface and an article lifting surface.

21. A shuffle conveyor comprising in combination,

a frame,

upper and lower frames structures supported within said frame for reciprocating movement, each of said frames having crosswise disposed flights,

a motor coupled to said upper and lower drive frames to reciprocate same,

article positioning means on some of said flights, said positioning means including a power source, a driven member coupled to said power source and disposed lengthwise on the flight and serving to move conveyed articles along the flight toward a flight extremity, stops on said some of said flight to limit article movement therealong.

4,685,553

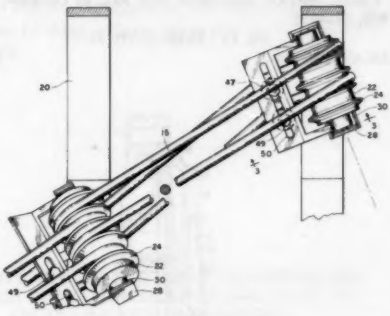
CONTAINER INVERTER

Michael W. Jennings, 1058 Salerno Dr., Campbell, Calif. 95008

Filed Nov. 21, 1985, Ser. No. 800,310

Int. Cl.[4] B65G *47/24*

U.S. Cl. 198—405 **2 Claims**



1. Container handling apparatus comprising:

a plurality of pulleys having grooves each adapted for supporting and driving an endless belt;

means rotatably supporting said pulleys to each side of a container path and in spaced relationship and at attitudes angularly displaced relative to the next preceding pulley along said container path;

a plurality of endless belts with substantially circular cross sections each supported around adjacent pairs of pulleys to form a continuous twisted path;

means driving said pulleys so that all belt segments adjacent said container path travel in the same direction to propel a container along said path, and

grooved guide means positioned adjacent and at substantially right angles to said pulleys for laterally engaging said belts to bend and partially align said belts with said supporting pulleys as they approach said supporting pulleys such that the displacement angle between the belt and pulleys is partially accommodated for by the guide means and partially by the pulleys to allow a greater angular displacement between adjacent pulleys.

4,685,554

EJECTION METHOD AND APPARATUS

Manfred Oberdorf, Gevelsberg, Fed. Rep. of Germany, assignor to Maschinerfabrik Alfred Schmermund GmbH & Co., Gevelsberg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 635,645, Jul. 30, 1984, abandoned. This application Dec. 12, 1985, Ser. No. 808,341

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1983, 3328323

Int. Cl.[4] B65G *47/34*

U.S. Cl. 198—468.6 **16 Claims**

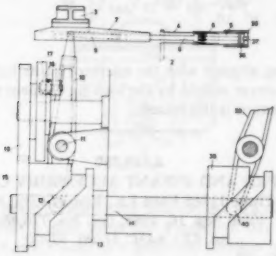
1. Apparatus for transferring partially package cigarette blocks from a rotatable first carrier provided with first cells into second cells of a second carrier for completing the packing, said first carrier having a revolution axis and said first cells being provided for receiving a block of cigarettes therein, the cells having axes and the carriers moving cells into an aligned transfer position, periodically in stepwise fashion, the steps of movement of the carriers being commensurate with the spacing between the axes of adjacent cells, a cell in the transfer position being circumscribed by a wrapper which is folded over a first end of the cell containing a cigarette block to form a first closed package end, the second opposite end of the package being open, said transferring apparatus comprising:

push-rod means, said push-rod means having an axis and being axially movable with respect to the carrier cells in

the transfer position between first and second limits of motion;

movable guide means for said push-rod means, said guide means being rotatably mounted on said revolution axis of said first carrier and further engaging said push-rod means and determining the position of the axis thereof relative to the carrier axes;

first means for imparting variable speed reciprocal motion to said push-rod means, said first motion imparting means cooperating with said guide means and including first cam means having a profile which results in said push-rod means being initially accelerated and thereafter braked to a lower feed speed at the time said push-rod means contacts the cigarette block within a first cell in the transfer position which cigarette block is to be transferred together with the wrapper folded over said first cell from said first cell into an adjacent second cell, said first motion imparting means subsequently accelerating said push-rod



means to complete the transfer of the block and the wrapper;

cam drive means for said guide means, said cam drive means synchronizing the motion of said guide means with the rotational motion of a first cell on the first carrier, said cam drive means permitting the axial motion of said push-rod means to exceed the dwell time between the steps of motion on the first carrier;

back-up means for cooperating with the first closed package end to prevent the reopening thereof, said back-up means being axially movable with respect to the carrier cells between first and second limits of motion; and

second means for imparting reciprocal motion to said back-up means, said second motion imparting means including second cam means and causing said back-up means to move in synchronism with said push-rod means during the time said push-rod means is in contact with the cigarettes of a block being transferred.

4,685,555

CONVEYOR HOOK LINK WITH PADDLE ASSEMBLY AND COUPLING METHOD

Robert W. Smith, Kaukauna, Wis., assignor to Badger Northland, Inc., Kaukauna, Wis.

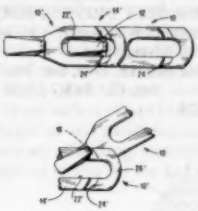
Filed Nov. 14, 1985, Ser. No. 797,998
Int. Cl.[4] B65G *19/24*
U.S. Cl. 198—731 **19 Claims**

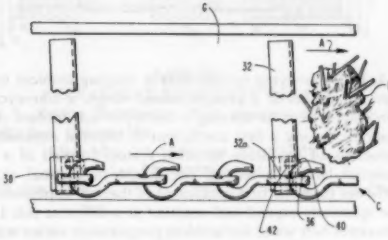
7. A hook link combined with a paddle assembly for a conveyor hook chain, comprising:

a hook-shaped portion including a projection tip adjacent a distal end of said hook-shaped portion;

a link portion substantially contained in a first plane, connected to said hook-shaped portion for receiving the hook-shaped portion of the adjacent hook link, means on said adjacent connected hook links to allow rotation with respect to one another in substantially the same plane, said projection tip extending toward said first plane, so that the normal clearance between said tip and the link portion of the adjacent connected hook link being insufficient to allow coupling/uncoupling action;

a tip receiving groove in the link portion for allowing substantially free passage of said projection tip across said link portion for coupling/uncoupling action whereby said tip and said groove allows easy coupling/uncoupling of said hook-shaped portion and link portion of adjacent





hook links by rotating said adjacent hook links relative to one another in substantially parallel planes while substantially eliminating uncoupling during normal conveyor operation even when subjected to incidental slackening; and

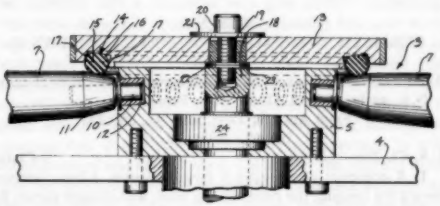
a paddle mounting bracket connected to said link portion and a paddle carried on said bracket.

4,685,556

DRIVE MECHANISM FOR A LIVE ROLLER CONVEYOR

Louis H. Joseph, Watertown, Wis., assignor to Dorner Mfg. Corp., Hartland, Wis.

Filed Nov. 4, 1985, Ser. No. 794,483
Int. Cl.[4] B65G *13/08*
U.S. Cl. 198—787 **9 Claims**



1. A curved live roller conveyor, comprising at least one pair of generally horizontal rotatable rollers disposed at an acute angle with respect to each other, a drive disc disposed above adjacent ends of said rollers, said disc having a lower flat surface and having an annular groove in said lower surface, said groove being concentric with the axis of rotation of said disc, drive means operably connected to said drive disc for rotating said disc, an endless resilient drive member mounted in said groove with the lower portion of said member projecting downwardly from said groove and disposed in engagement

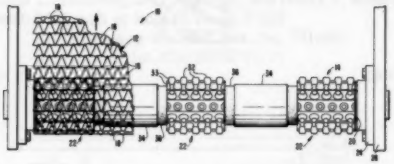
with said adjacent ends of said rollers, and adjusting means for adjusting the vertical position of said disc relative to said adjacent ends of said rollers to thereby vary the frictional force between said endless member and said adjacent ends, rotation of said drive disc acting through said drive member to rotate said rollers about their axes.

4,685,557

CONVEYOR BELT DRIVE SPROCKET SYSTEM

Gerald C. Roinestad, Winchester, Va., assignor to Ashworth Bros., Inc., Fall River, Mass.

Filed Feb. 13, 1985, Ser. No. 701,242
Int. Cl.[4] B65G *23/06*
U.S. Cl. 198—834 **24 Claims**



1. In a conveying system used in varying ambient temperature conditions of a predetermined range, a conveyor drive sprocket system for driving a conveyor belt formed of a first material having a first coefficient of thermal expansion with sprockets of the drive sprocket system formed of a second material having a second coefficient of thermal expansion different from the first coefficient of thermal expansion so that the sprockets expand and contract at a different rate than the conveyor belt when the ambient temperature varies within the predetermined range, said drive sprocket system comprising:

a plurality of sprocket segments formed of said second material and spaced from one another along the width of the conveyor belt, each sprocket segment having a plurality of teeth arranged in a spaced relationship along the width and circumference of the segment in order to mesh with the conveyor belt, each sprocket segment having a width correlated to the different rate of expansion and contraction between the conveyor belt and sprocket segment to be not greater than the maximum width the sprocket segment can have for said teeth to remain in mesh with the conveyor belt throughout the predetermined range of varying ambient temperature; and

said sprocket segments being spaced from one another a sufficient degree so that said sprocket segments do not thrust laterally against one another throughout the predetermined range of varying ambient temperature.

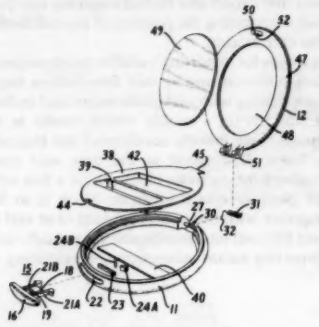
4,685,558

COSMETIC COMPACT WITH PINLESS INTERNAL HINGE

Alain Filiz, New York, N.Y., and Salvatore J. Ascolese, Edison, N.J., assignors to L'Oreal, S.A., France

Filed Apr. 10, 1986, Ser. No. 850,233
Int. Cl.[4] A45C *13/10*
U.S. Cl. 206—1.5 **5 Claims**

1. A compact comprising a cover portion, a base portion, means for hinging the cover to the base, and closure means for opening and closing the compact, characterized in that the closure means includes a subassembly comprising a button, an apertured locking element, and a pair of runners, one on each side of the locking element and each including a relatively flexible longitudinal leg portion and a stiffer enlarged end portion, the locking element and the runners being integral with the button for movement with it, stopping means and vertical support means in the bottom of the base portion, and a pin in the wall of the cover, the runners being aligned so that when the button is depressed the enlarged end portions abut the stopping means, the locking element passes over the vertical support means for vertical support, and the leg portions of the runners are flexed by the abutment for storing energy for restoring the button to its updepressed state when released, and



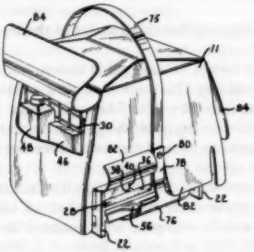
the pin being aligned with the aperture in the locking element so that the cover is held by the locking element to be released when the button is depressed.

4,685,559

DIAPER AND INFANT ACCESSORY CADDY

Hubert W. Titus, 11565 Food La., Kansas City, Mo. 64134

Filed Sep. 16, 1985, Ser. No. 776,684
Int. Cl.[4] A45C *11/00, 15/00*
U.S. Cl. 206—38 **15 Claims**



1. A diaper caddy for carrying diapers and other infant supplies and for dispensing the diapers, said caddy comprising:

a rigid frame having a base for supporting the frame on a support surface and having sides and a back characterized by bars arranged in a predetermined manner;

handle means on said frame for carrying of the frame by hand;

at least one diaper compartment presented by said frame and having a size to receive and hold a stack of folded diapers, each diaper being substantially horizontally oriented and said compartment having a floor for supporting the diaper stack, a top through which diapers can be loaded into the compartment, and a substantially open front;

a plurality of trays on said frame for receiving and holding infant supplies;

a solid horizontal strip extending across said substantially open front;

a dispensing slot in said frame for dispensing the diapers contained in said compartment, said slot being located between said floor and strip, said strip having a cut out portion to allow finger access to the bottom diaper in the diaper stack contained in the compartment to permit the bottom diaper to be removed by hand through said slot;

a flexible cover applicable to the frame to cover said compartment, said cover being removable from the frame to expose said top of the compartment;

flap means on said cover for normally covering said slot, said flap means being retractable to expose said slot to permit dispensing of diapers therethrough; and

a flap on said cover for each tray, said flaps normally covering the trays but being retractable to expose the trays and the contents thereof.

4,685,560

DOOR HOOK RETAINER LOOP PATCH

William L. King, Denver, Colo., assignor to Samsonite Corporation, Denver, Colo.

Filed Feb. 20, 1986, Ser. No. 831,759

Int. Cl.[4] A45C *5/06, 5/12, 13/10, 13/34*

U.S. Cl. 206—287.1 **4 Claims**

1. A door hook retainer loop path for use in a closure system which includes a door hook for a garment bag and the like comprising a patch base of a generally flexible laminar material, a series of slots through said patch base, webbing, passing out one of such slots and back in another of said slots in a sinuous path so as to form at least one loop on one side of said patch base, stitching for holding said webbing in place and in said sinuous path, and a foam insert positioned between said patch base and a wall of said garment bag to which said patch is attached, said loop being sized to selectively receive and hold the hook of said closure system when the hook is utilized to hold the garment bag in a closed condition, said stitching passing through said patch base, said webbing, said insert and said wall of said garment bag, whereby a restoring resiliency is provided by said foam insert to grip said hook when said hook is received in said loop.

4,685,561

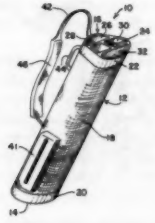
GOLF BAG DEVICE

Eric W. Reimers, 235 N. First St., Missoula, Mont. 59802

Filed Oct. 3, 1985, Ser. No. 783,767

Int. Cl.[4] A63B *55/00, 55/06*

U.S. Cl. 206—315.6 **17 Claims**



1. A golf bag device, comprising:

a bag portion in which the clubs and other equipment are stored, the bag portion having a closed end and an open end and being enclosed to form a generally tubular element, the bag portion including a rigid collar situated at said open end, a rigid base situated at said closed end, exterior enclosing means adapted to extend between said collar and said base to separate the interior from the exterior of the bag portion, and an interior divider adapted to separate the interior volume of the bag portion into a plurality of distinct, full length compartments; and

carrying means attached to the bag portion by which the bag device may be lifted and transported;

wherein the bag portion is characterized by having a longitudinal cross-section in the nature of a parallelogram, with said base and said collar forming lower and upper surfaces, respectively, which are parallel to a setting surface when the bag portion is in a rest mode, the rest mode being when the bag portion is placed upon such a setting surface such that said lower surface of said base abuts thereagainst and the side edges of said parallelogram, formed by the enclosing means, are offset from vertical in said rest mode defining an angle of incline for the bag device.

4,685,562

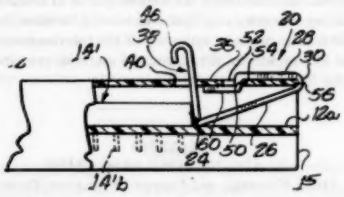
RELEASABLE STOP GATE DEVICE

Henry L. Swain, Bedminster, N.J., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Mar. 10, 1986, Ser. No. 837,781

Int. Cl.[4] B65D *85/46*

U.S. Cl. 206—328 **8 Claims**



1. In combination, a magazine for multiple semiconductor packages comprising an elongated tubular member having an interior cross-sectional configuration adapted to confine in sliding orientation semiconductor packages, said tubular member having two spaced apart through apertures formed through its upper sidewall adjacent one open end of said tubular member; and a releasable stop gate device comprising a one-piece integrally formed member having first and second legs joined along a common edge to define an acute angle, said legs being resiliently compressible about said joined edge, abutment surface means extending from an end of said first leg opposite said joined edge, and attachment means formed on the outer free end of said second leg for extending through and gripping one of said spaced apart through apertures to effect attachment of said second leg in a generally flat, surface-to-surface engagement with said upper sidewall surface adjacent said one open end of said tubular container, such that the first leg and abutment surface means extend retractably into the tubular container member, said stop gate device further includes gripping means extending from said abutment surface means and extending through the other of said spaced apart apertures for receiving said gripping means therethrough to be grasped and pulled generally away from said sidewall to effect resilient compression of said first leg into a substantially flat condition against an inner surface of said upper sidewall, thereby retracting said abutment surface means from the interior of said tubular container member.

4,685,563

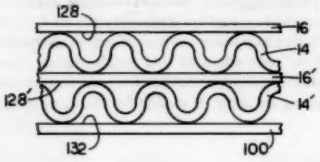
PACKAGING MATERIAL AND CONTAINER HAVING INTERLAMINATE ELECTROSTATIC SHIELD AND METHOD OF MAKING SAME

Philip S. Cohen, Cincinnati, and Robert E. Schnittger, Jr., West Chester, both of Ohio, assignors to Michelman Inc., Cincinnati, Ohio

Continuation of Ser. No. 494,630, May 16, 1983, abandoned. This application Nov. 30, 1984, Ser. No. 676,831

Int. Cl.[4] B65D *73/02*

U.S. Cl. 206—328 9 Claims



1. A laminated packaging material with an interlaminate electrostatic shield for protecting electrostatically sensitive components from electrostatic potential, comprising:

(a) a first paperboard lamina;

(b) a second paperboard lamina, one side of said second lamina being secured about one side of said first lamina to form a laminated structure having a first surface formed by the first paperboard lamina and a second surface formed by the second paperboard lamina; and

(c) a continuous electrically conductive coating disposed between said first and second lamina with said first and second surfaces being substantially free of the conductive coating whereby said first and second laminae isolate and protect the physical integrity of the interlaminate coating and all surfaces of the laminated material remain substantially free of the coating.

4,685,564

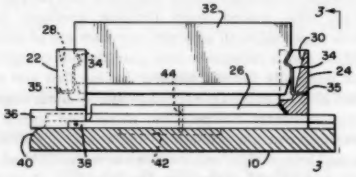
BLADE-HOLDER MAGAZINE

Ivan E. Hills, Kinnelon, and George Holmelund, Dover, both of N.J., assignors to Hacker Instruments, Inc., Fairfield, N.J.

Filed Jul. 30, 1986, Ser. No. 890,647

Int. Cl.[4] D65D *83/10*

U.S. Cl. 206—354 9 Claims



1. A blade-holder magazine, comprising:

a platform; and

a plurality of blade carriers;

said platform and said carriers having means cooperative for supporting said carriers slidably upon said platform;

each of said carriers having means defining a recess in which nestably to receive a blade; wherein

said recess-defining means comprises a limb; and

said limb comprises means operative for (a) opening said recess, in a first operative mode, to accomodate release of a blade therefrom, and (b) closing said recess, in a second operative mode, to confine said blade therein.

4,685,565

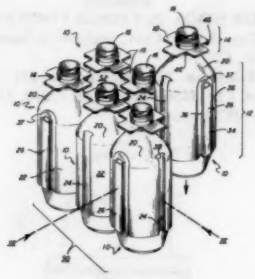
INTERCONNECTABLE BEVERAGE CONTAINER SYSTEM

Michael Sparling, 34 Tyler St., Rochester, N.Y. 14621

Filed Jan. 24, 1986, Ser. No. 822,148

Int. Cl.[4] B65D *21/02*

U.S. Cl. 206—427 14 Claims



1. A container for beverages or the like which is connectable with a plurality of like containers to form a multi-pack cluster of said containers without necessity of an external binding material, the container having a longitudinal axis and comprising a neck portion having a sealable opening thereon and a round body portion coaxial therewith and having a generally cylindrical sidewall of a predetermined radius, a plurality of axially extending male tongue members and a plurality of axially extending female groove members, said tongue members and said groove members being spaced at regular intervals about the periphery of said body portion, said tongue members each having a front surface situated radially within said radius and a pair of oppositely disposed axially extending undercut sides, and said groove members each having a pair of oppositely disposed undercut axially extending projections defining a void therebetween, said tongue member being snugly slidable in the axial direction into the void of a respective groove member of another container in said cluster.

4,685,566

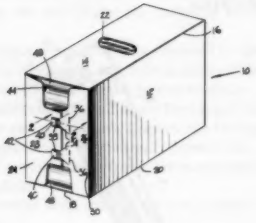
SLEEVE-TYPE CARRIER

Jerry F. Wilson, West Monroe, La., assignor to Manville Sales Corporation, Denver, Colo.

Filed Dec. 24, 1985, Ser. No. 813,340

Int. Cl.[4] B65D *71/00*

U.S. Cl. 206—429 10 Claims



1. A sleeve-type carrier, comprising:

a top panel,

a bottom panel,

side panels integral with and foldably connected to the top and bottom panels, and

end panels closing a major portion of the end openings between the top, bottom and side panels,

each end panel comprising two mechanically interlocked

flaps integral with and foldably connected to the adjacent ends of the side panels,

each flap being of generally similar shape and extending from its side panel a distance greater than half the width of the carrier, whereby the end portion of one flap overlaps the end portion of the other flap,

said one flap containing a cutout in the overlapping area of the flap near the outer edge thereof and the other flap containing a locking tab struck therefrom, the end of the portion of said other flap from which the locking tab was struck being near the outer edge of said other flap and the base of the locking tab being foldably connected to said other flap at a location spaced from the outer edge of said one flap,

the locking tab extending over the outer edge of said one flap, through the cutout in said one flap and through the portion of the other flap from which the locking tab was struck, thereby mechanically locking the flaps together,

the height of the flaps at the foldable connections to the side panels being greater than the height of the flaps in their overlapping end portions, whereby the end panels contain open gaps located centrally thereof adjacent the top and bottom panels, and

wherein the cutout contains a retaining tab struck from said one flap, whereby the retaining tab assists in holding the locking tab in place.

4,685,567

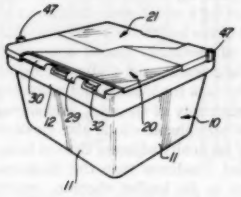
NESTABLE, STACKABLE TOTE BOXES

Daniel D. Webb, Troy, Mich., assignor to Peninsula Plastics Company, Inc., Auburn Hills, Mich.

Filed Nov. 13, 1986, Ser. No. 929,899

Int. Cl.[4] B65D *21/06, 21/02, 43/16, 51/24*

U.S. Cl. 206—506 **12 Claims**



1. A nestable, stackable tote box comprising:

an open top container shaped to nest within a similar container, and having an upper edge with a pair of opposed, horizontal side edge portions;

a pair of generally flat cover pieces, each formed of an inner part and an outer part which are hingedly connected together end-to-end, and with each cover piece spanning the container open top between the pair of opposed side edge portions;

hinge means connecting one of the outer cover parts to one of the container side edges and the other cover outer part to the opposed cover side edge, with the cover outer parts each being narrower than the lengths of their respective side edges and said hinge means permitting sidewise movement of each of the cover outer parts relative to its respective container side edge, as well as axial pivoting movement of the cover outer part into and out of the container;

each of said cover pieces being sidewise movable into a covering position wherein the pieces are substantially co-planar and wherein its outer and inner parts are supported upon the container transverse edge portions, that is, the portions that are located between the container side edge portion to which it is hinged and the opposed container side edge portion to which the other cover piece is hinged, and with the adjacent edges of the cover pieces engaging each other to completely close the container open tops;

and each of the cover pieces being pivotable and endwise movable into a non-covering position wherein it is out of contact with the container edge portion upon which it may be supported and instead, it extends downwardly along the outside or the inside of the container, with the inner cover part pivotallly folded generally parallel to the outer cover part for nesting one container within another.

4,685,568

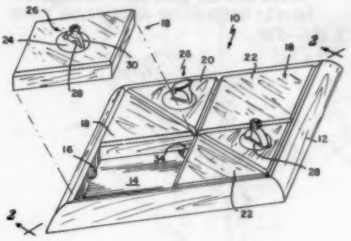
DISPLAY TRAY WITH REVERSIBLE INSERTS

Leonard Elsfelder, 8108 Old State Rd., Evansville, Ind. 47710

Filed Aug. 21, 1986, Ser. No. 898,648

Int. Cl.[4] B65D *1/34, 6/04*

U.S. Cl. 206—561 **10 Claims**



1. A display tray comprising a tray bed and a plurality of inserts, each insert having a first side which includes means for holding an article and a second side, the inserts removably received in the tray bed with the first side presented for viewing when an article is held in the holding means, and the inserts removably received in the tray bed with the second side presented for viewing when an article is not held by the holding means.

4,685,569

METHOD OF DETECTING AND SORTING PIECES OF INSULATING MATERIALS ADMIXED IN SMALL PIECES OF CONDUCTIVE MATERIALS

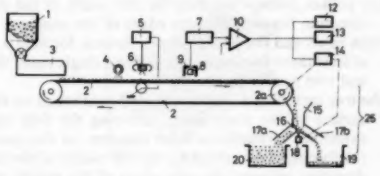
Shigeyoshi Osaki, Takarazuka, and Shin-ichi Nagata, Matsubara, both of Japan, assignors to Kanzaki Paper Mfg. Co., Ltd., Tokyo, Japan

Filed Sep. 17, 1984, Ser. No. 662,419

Claims priority, application PCT Int'l Appl., Jan. 18, 1983, PCT/JP83/00016

Int. Cl.[4] B07C *5/344*

U.S. Cl. 209—571 **9 Claims**



1. A method of detecting and sorting pieces of insulating material admixed in small pieces of conductive material which comprises distributing said material in a thin layer on an electrically conductive surface, conveying said materials forward on said conveying surface, measuring the value proportional to the change of surface charge carried on said materials by means of a surface potentiometer having electrodes disposed above and across the width of said conveying surface, said electrodes being connected via a resistance with an input ter-

minal of a differentiation type amplifier having a feed back resistor connected in parallel therewith, the output current of said amplifier being applied via resistance to a main amplifier having a sensitivity setting element, the output current of said main amplifier being applied to a comparator, inputting said amplified current into said comparator, sending an output signal generated by said comparator to a timer when the voltage of said inputted amplified current exceeds a reference value set in said comparator, and, in response to said output signal received from said comparator, delivering from said timer an output signal according to the set time thereof to effect a subsequent sorting operation.

4,685,570

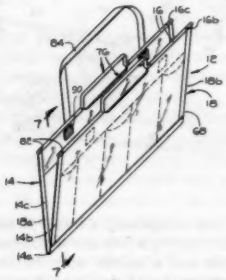
ACTIVITY TOTE

Sheila Medow, 5013 Elm St., Skokie, Ill. 60077

Filed Dec. 24, 1985, Ser. No. 813,015

Int. Cl.[4] B65D *69/00;* **A45C** *11/36, 15/00*

U.S. Cl. 206—579 **3 Claims**



1. An activity tote comprising, a relatively large main sheet folded, forming a fold juncture edge and a pair of panels on opposite sides of that edge, the tote having a folded carrying position with the fold edge lowermost, the panels thereby having inner surfaces facing each other in the folded carrying position, and the panels having free edges extending upwardly, and having side edges, and with the free edges constituted by swinging edges parallel with and spaced from the fold edge,

the panels being separate from each other at their side edges and free edges,

the tote including pocket pieces on the inner surfaces of the panels having inner ends positioned closely adjacent the fold edge and oute ends adjacent to but spaced from the free edges of the panels, the pocket pieces being secured to the panels at the edges of the pocket pieces respectively adjacent the fold edge and side edges of the panels, thereby forming pockets of the pocket pieces having access ends at said outer ends of the pocket pieces, and the remaining edges of the pockets being closed,

the pocket pieces extending the full width of the panels in direction between the side edges of the panels,

each panel and the pocket pieces thereon forming a pack of at least three thicknesses including a single panel thickness and two pocket pieces,

the tote including a reinforcing strip positioned on the outer surface of the main sheet, covering the fold edge and extending upwardly a short distance on the panels, the reinforcing strip extending the full width of the panels in direction between the side edges of the panels, the reinforcing strip being secured in its position by stitching therethrough and through the panels and pocket pieces together, at positions on opposite sides of the fold edge and closely adjacent thereto,

the panels and pocket pieces, and thus the entire tote, except for small pieces including reinforcing strip, binding strips and securing elements, being of transparent material, and objects being easily viewable therein and therethrough,

the panels and the pocket pieces being of limited flexibility about transverse axes, providing pliability to the tote as a whole, but possessing limited rigidity resisting crumpling by opposed forces applied thereto at the edges,

the securement together of the reinforcing strip and panels and pocket pieces in direction between the side edges of the panels and the securement together of the pocket pieces and panels in direction perpendicular to the fold edge, together with the extension of the pocket pieces to position adjacent the free edges of the panels, providing great strength to the tote when in folded position, thereby enabling the tote when in folded position to be used effectively as a lap board, and

the tote including carrying handles at the free edges of the panels.

4,685,571

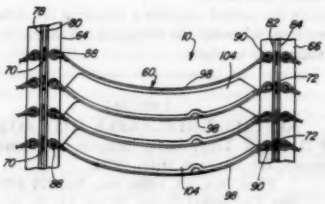
SHIPPING UNIT

Donald A. Hoss, Southfield, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Nov. 3, 1986, Ser. No. 926,275

Int. Cl.[4] B65D *81/02*

U.S. Cl. 206—583 **5 Claims**



1. A shipping unit which protects easily damaged articles of manufacture during transit comprising a rack including a bottom wall having a width and a length, an upstanding end wall at each end of the length of the bottom wall, at least one tier of a plurality of vertically spaced apart shelves suspended between the end walls, said shelves being accessible along the length of the rack for loading and unloading articles of manufacture transversely of the rack, said shelves being fabricated of a pliable stretchable cloth, the vertical distance between each pair of vertically adjacent shelves being slightly greater in the unloaded condition than the thickness of the article of manufacture to be loaded thereon, articles of manufacture loaded onto at least two vertically adjacent shelves, the superjacent shelve being stretched by the article of manufacture loaded thereon into contact with the article of manufacture loaded onto the subjacent shelve.

4,685,572

ANTI-THEFT DEVICE, IS PARTICULAR FOR A GARMENT-HANGER

Timothy Jamison, 85, Chemin des Hauts de Grisy, F - 78450 Villepreux, France

Filed Jan. 16, 1986, Ser. No. 819,802

Int. Cl.[4] A47G *25/14, 25/48*

U.S. Cl. 211—4 **6 Claims**

1. An anti-theft device for securely coupling a garment hanger of any type to a rail or the like, said anti-theft device being securely connected to a portion of a hook of said garment hanger and comprising a lockable suspension means suitable for occupying a locked position on the rail preventing the device and the hanger from being removed from the rail, and having an unlocked position enabling the device and the hanger to be removed from the rail, said lockable suspension means comprising a block having a fixed hook for suspending from the rail and a moving arm pivotally mounted on the block between a first position in which it is separated from the free end of the hook by a distance greater than the diameter or the transverse dimension of the rail, and a second position in which it is close to the free end of the hook and prevents the rail from

passing through, locking means being provided on the block and co-operating with the moving arm to lock the moving arm in its second position, the block also including a housing or

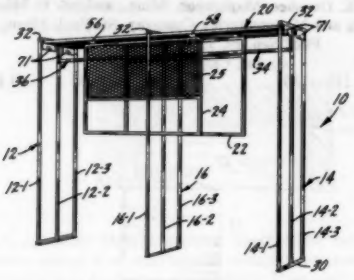
passage for receiving at least a portion of the hook belonging to the hanger, and including means, e.g. a screw, for securely retaining said hook portion in said housing or passage.

4,685,573

SAMPLE DISPLAY STAND

Ernest G. Ovitz, III, Galva, Ill., assignor to John H. Best & Sons, Inc., Galva, Ill.

Filed Mar. 10, 1986, Ser. No. 838,164
Int. Cl.[4] A47F 7/16
U.S. Cl. 211—46 **4 Claims**



1. In a display stand for rug samples and the like, having an upright floor-mounted frame supporting, at the top, a plurality of horizontal tracks enabling panels which support such samples to be suspended therefrom for sliding movement back and forth by which the customer may examine the samples, an improved track and suspension means combined with each such panel and comprising:

an elongated track member of steel plate of general inverted hollow trough shape having spaced opposed sides joined at the top,

one side of said track member having a long extension at the bottom thereof including a portion which

extends laterally to one side of said trough to afford a first lateral track for one roller, which extension is folded back upon itself and thence upward as a medial portion into the space between the trough sides at the bottom thereof, and which extension then extends from said medial portion laterally outward to the other side of said trough to afford a second lateral track for a second roller;

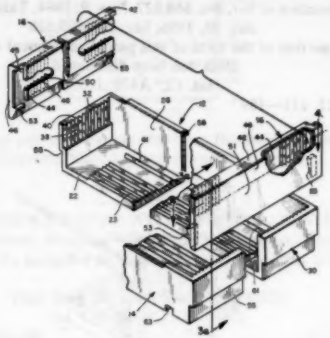
the opposite side of said track member at the bottom thereof including a lateral extension mated to said second lateral track, the two lateral tracks being substantially in the same plane whereby a weight suspended thereon results in opposed moment arms opposed by said medial extension portion; a roller shackle suspending a sample display frame; and said shackle supporting a pair of rollers respectively engaging said tracks.

4,685,574

SHELF-SUPPORTED EXPANDABLE GRAVITY FEED SYSTEM

Raymond R. Young, Glenview; John F. Deffner, Lisle, and Russell M. Barnes, Bloomingdale, all of Ill., assignors to Visual Marketing Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 569,539, Jan. 10, 1984, which is a continuation-in-part of Ser. No. 452,374, Dec. 22, 1982, abandoned. This application Oct. 16, 1985, Ser. No. 787,838
Int. Cl.[4] A47F 1/00
U.S. Cl. 211—59.2 **21 Claims**



1. A gravity feed system comprising:

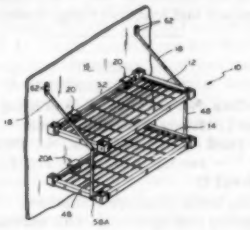
a pair of side members, each side member including a support track, a wall, and two end members, each of said end members being corrugated on at least one side; and two fastening means removably interconnectable with said end members, each fastening means having at least one corrugated side which cooperates with the corrugated sides of the end members on a pair of side members, so that said side members can be secured in parallel relationship to each other.

4,685,575

WALL MOUNTING SYSTEM FOR SHELVES

Irwin Kulbersh, Skokie, Ill., assignor to Amco Corporation, Chicago, Ill.

Filed Aug. 6, 1986, Ser. No. 893,579
Int. Cl.[4] A47F 5/08
U.S. Cl. 211—90 **9 Claims**



1. A shelf system mounted on a wall comprising at least two shelves; a first pair of brackets adapted to be mounted on said wall at any desired location to receive and removably hold one of said shelves; a first pair of braces mounted on said wall and secured to said one shelf; a second pair of brackets adapted to be mounted on said wall at any desired location beneath said first pair of brackets to receive and removably hold said other shelf; wherein each bracket in said first and second pairs of brackets is C-shaped with an interior space that opens external

of said bracket, said interior space adapted to receive and removably hold said shelves; and a pair of support members removably secured to said one shelf and extending downwardly therefrom, said other shelf removably secured below said one shelf to said second pair of brackets and to said pair of support members.

4,685,576

THREE AXIS CORNER BRACKET

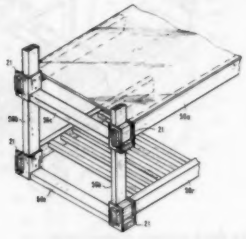
Willis S. Hobson, Columbus, Ind., assignor to Seymour Mfg. Co., Seymour, Ind.

Continuation of Ser. No. 669,827, Nov. 9, 1984. This application Jan. 29, 1986, Ser. No. 823,626

The portion of the term of this patent subsequent to Oct. 14, 2003, has been disclaimed.

Int. Cl.[4] **A47F** *5/00*

U.S. Cl. 211—189 **5 Claims**



1. An adjustable support rack for receiving articles such as firewood, said adjustable support rack comprising:

a plurality of width-defining connecting members;

a plurality of length-defining connecting members;

a plurality of upright retention members;

a plurality of support brackets each designed and arranged to define three openings, each opening being suitably sized and shaped for receipt of corresponding ones of said members, a first one of said openings being non-intersecting with the second and third openings and said second and third openings being arranged such that they are intersecting with each other; and

said support brackets being designed and further arranged so as to be movable relative to said width-defining connecting members and arranged so as to be movable relative to said length-defining connecting members so as to vary the length and width of said adjustable support rack up to the maximum dimensions of said width-defining connecting members and said length-defining connecting members.

4,685,577

NURSING BOTTLE

Wen Chung Chen, No. 18, Lane 31, Wen Ming Road, Tun Tong T'sun, Hou Li Hsiang, Taichung, Taiwan

Filed Apr. 24, 1986, Ser. No. 855,397

Int. Cl.[4] **A61J** *9/04, 11/04*

U.S. Cl. 215—11 D **1 Claim**

1. A nursing bottle structure comprising:

a bottle having two open ends with reduced diameters and threads provided on circumferential walls thereof;

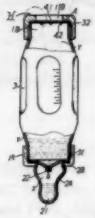
upper and lower caps being engaged with the threads on the circumferential walls of the two open ends of the bottle and each having a circular opening at a central portion thereof;

a nipple secured at one of the two open ends of the bottle in the circular opening of the upper cap;

a funnel-shaped discharge regulating element held by the upper cap under the nipple and arranged with a dripping passage facing outwardly from the open end of the bottle; and

means for flexibly hinging the discharge regulating element together with the nipple as a unit; and

an air-penetrating board being held opposite to the nipple at the other of the two open ends of the bottle in the circular opening of the lower cap and having a plurality of air-inlet apertures, each including a cone-shaped check valve



means for permitting air to flow into the bottle when suction force on the nipple opens the check valve means;

whereby air is enabled to flow into the bottle directly through the check valve means of the air-inlet apertures so that fluid contained in the bottle can be discharged in a steady manner without being mixed with the air.

4,685,578

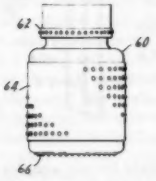
TAMPER INDICATION SYSTEM

Wayne, K. Dunshee, Maplewood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 10, 1986, Ser. No. 905,872

Int. Cl.[4] **B65D** *55/02*

U.S. Cl. 215—230 **19 Claims**



1. An indicator for indicating that pressure has been applied thereto comprising an upper layer and a lower layer, said layers cooperating to form a series of compartments separated by rupturable areas, at least some of the compartments containing a flowable material and either the area between compartments or adjacent compartments containing a second material which when mixed with said flowable material causes a color change in either of said materials which is viewable through at least one layer.

4,685,579

TAMPER PROOF BOTTLE

Gerard V. Stapleton, 10 Spruce St., Garden City, N.Y. 11530

Filed Oct. 6, 1986, Ser. No. 915,580

Int. Cl.[4] **B65D** *55/02*

U.S. Cl. 215—230 **7 Claims**

1. A tamper proof bottle comprising:

(a) a container for holding a plurality of items within;

(b) an absorbent padding placed on top of said items within said container;

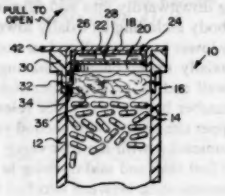
(c) a cap having a recessed portion;

(d) a liquid placed within said recessed portion of said cap when said cap is inverted;

(e) a line having a first end inserted within said liquid and against said recessed portion of said cap;

(f) a waterproof membrane sealed over said liquid and said first end of said line; and

(g) a collar having a retainer on the inside wall thereof with the second end of said line secured to said retainer said



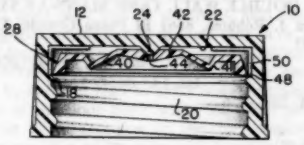
collar permanently attached to top of said container, whereby when a person removes said cap from said collar said line will pull on said membrane causing said membrane to break allowing said liquid to come out and wet said padding within said container.

4,685,580

ANTI-PANELLING CONTAINER CLOSURE

Edward J. Towns, Summit, and Edward M. Brown, Livingston, both of N.J., assignors to TBL Development Corporation, Livingston, N.J.

Filed Apr. 18, 1986, Ser. No. 853,769
Int. Cl.[4] B65D *51/16*
U.S. Cl. 215—260 **17 Claims**



1. A container closure member adapted for receiving a container sealing liner, said closure member comprising a top panel and a skirt depending downwardly from said top panel, first projection means depending downwardly from said top panel interiorly of said closure for defining, with said liner received in said closure member, a first air flow passage extending from beneath said top panel to said skirt, and second projection means depending inwardly from said skirt interiorly of said closure for defining, with said liner received in said closure member, a second air flow passage extending downwardly along said skirt, said second air flow passage being in flow communication with said first air flow passage.

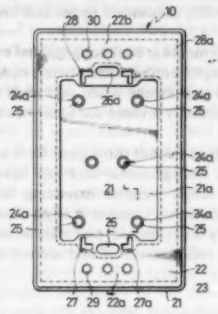
4,685,581

AIR- AND DUST-PROOF COVER FOR FLUSH MOUNTING WIRING FIXTURE

Hiroshi Kaneda, Hisai; Mitsuhiro Takagi, Tsu, and Masaaki Nakamura, Ichishi, all of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Jan. 9, 1987, Ser. No. 1,833
Claims priority, application Japan, Jan. 25, 1986, 61-14318; Jul. 25, 1986, 61-176206
Int. Cl.[4] H02G *3/08*
U.S. Cl. 220—3.2 **5 Claims**

1. An air- and dust-proof cover for a flush mounting wiring fixture, comprising a housing part for housing therein said wiring fixture and to be accommodated in a recess made in a building structural member with said wiring fixture housed, a flange part extended around said housing part to lie over peripheral edges of said recess in said structural member and having a reinforcing plate embedded therein, and cylindrical parts respectively extruded both inward and outward from



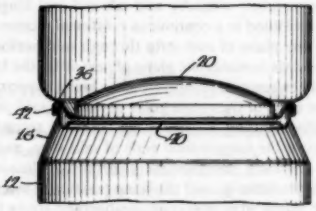
said housing part and having therein a flexible thin-wall portion for penetrating therethrough connecting wires.

4,685,582

CONTAINER PROFILE WITH STACKING FEATURE

Sam C. Pulciani, Norridge, and Robert M. Szczerba, Algonquin, both of Ill., assignors to National Can Corporation, Chicago, Ill.

Filed May 20, 1985, Ser. No. 736,428
Int. Cl.[4] B65D *6/02, 21/02*
U.S. Cl. 220—66 **11 Claims**



1. A drawn and ironed beer and beverage container of the 8-ounce and also the 12-ounce and 16-ounce variety and having a bottom profile adapted to nest with a 206-end seamed to an open end of another container comprising a cylindrical side wall having an integral bottom having a first arcuate annular portion integral with said side wall and having an interior radius of approximately 0.200 inch, a second arcuate annular portion integral with a lower end of said first arcuate annular portion and having an exterior radius substantially less than the radius of said first arcuate annular portion, a generally U-shaped annular portion integral with said second arcuate annular portion said U-shaped annular portion having an outer annular wall integral with said second arcuate annular portion and an inner substantially vertical annular wall, said walls defining an acute angle of substantially less than 45° interconnected by an arcuate segment defining a lower annular support for said container, and an inwardly-domed spherical disc integral with said substantially vertical annular wall and having a radius greater than the diameter of said lower annular support and less than the diameter of said cylindrical side wall, said second arcuate annular portion defining a peripheral contact with said end.

4,685,583

DISPOSABLE BEVERAGE CUP HANDLE

Kelly D. Noon, 1640 Kiowa Crest Dr., Diamond Bar, Calif. 91765

Continuation-in-part of Ser. No. 657,942, Oct. 4, 1984, abandoned. This application May 16, 1986, Ser. No. 864,437
Int. Cl.[4] B65D *25/28*
U.S. Cl. 220—94 R **5 Claims**

1. A handle accessory for use with beverage cups compris-

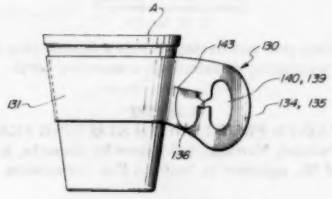
ing an elongated strip of thin, substantially uniform thickness flexible material, said strip having:

(a) arcuate, greatly concentric upper and lower longitudinal edges,

(b) oval enlargements at both longitudinal ends of said strip, said oval-shaped enlargements being congruent and providing hand grip means when said ends of said strip are folded conformally around the outer circumferential wall of a cup,

(c) an oval-shaped tab cut through at least a first one of said oval-shaped enlargements, said tab having a generally rectangular hinge member extending longitudinally inward from the inner transverse edge of said tab,

(d) a generally oval-shaped perforation cut through said oval-shaped enlargement of said second end of said strip,



said perforation being congruent with said tab and said hinge member, whereby said tab and said hinge member may be folded in a continuous rotational motion outwards from the plane of said strip through said perforation and backwards towards the plane of said strip, the lower edge of said rectangular hinge member being supported by the upper edge of the rectangular portion of said perforation, thereby securing together said first and second enlargements of the longitudinal ends of said strip, and

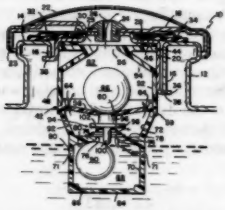
(e) a generally longitudinally disposed, linear slit cut through said strip, said slit being positioned inwards of the inner lateral edge of said perforation and above the rectangular portion of said perforation, whereby the upper longitudinal edge of said tab may be inserted lockingly upwards into said slit.

4,685,584

VENTED FUEL CAP WITH BUMP AND GRADE SEAL

Robert S. Harris, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Filed Sep. 29, 1986, Ser. No. 912,804
Int. Cl.[4] B65D *51/16*
U.S. Cl. 220—204 **22 Claims**



1. A cap for closing the filler neck of a vehicle fuel tank containing fuel, the fuel tank having a normally upwardly extending filler neck with a peripherally and radially extending, upwardly facing sealing surface concentric with the longitudinal axis of the neck, the cap comprising:

a cover having an opening formed therethrough;

means providing a concentric housing extending downwardly into said filler neck and connected to said cover;

means providing a seal between said housing means and said sealing surface;

a valve body partially disposed in said housing means and extending downwardly into said filler neck;

said valve body including an axially lower chamber having an axially lower bottom wall and an axially upper top wall and an axially upper chamber having an axially lower bottom wall and an axially upper top wall, said axially lower chamber having first vapor release means and said axially upper chamber having second vapor release means in communication with the first vapor release means and with said fuel tank and said opening in said cover to provide communication between said fuel tank and the atmosphere;

first means in said axially lower chamber for sealing said first vapor release means when said filler neck is tilted or subjected to a bump; and

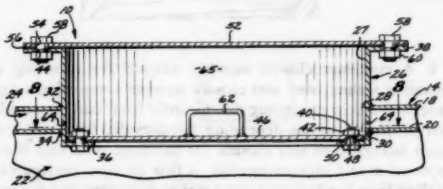
second means in said axially upper chamber for sealing said second vapor release means when said filler neck is in a substantially inverted position.

4,685,585

DOUBLE WALL TANK MANWAY SYSTEM

Howard J. Robbins, 8561 El Paseo Grande, La Jolla, Calif. 92037

Filed Oct. 9, 1986, Ser. No. 917,028
Int. Cl.[4] B65D *51/18*
U.S. Cl. 220—256 **20 Claims**



1. In a double wall tank having an inner wall defining an inner primary chamber for primary fluid containment and an outer wall which, together with said inner wall, defines an outer secondary chamber for secondary fluid containment, a tank manway assembly which comprises:

tubular riser means having inner and outer ends rigidly mounted in apertures through both of said inner and outer tank walls so as to provide communication between the outside of said outer tank wall and said inner primary chamber;

inner flange means on said riser means defining a first outwardly facing seat extending substantially continuously about the periphery of said riser means;

outer flange means on said riser means defining a second outwardly facing seat extending substantially continuously about the periphery of said riser means;

an inner cover member peripherally engageable over said first seat, and first securing means for securing said inner cover member to said inner flange; and

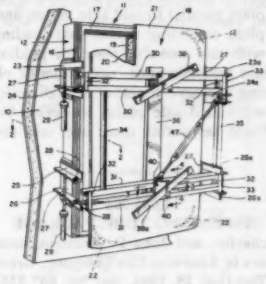
an outer cover member peripherally engageable over said second seat in outwardly spaced relationship to said inner cover member, and second securing means for securing said outer cover member to said outer flange means.

4,685,586

BOILER PENTHOUSE ACCESS DOOR

Robert L. Lewis, Jr., Baxley, Ga., and J. Albert Hudson, Knoxville, Tenn., assignors to Environmental Products & Services Co., Inc., Skillman, N.J.

Filed Apr. 18, 1986, Ser. No. 853,564
Int. Cl.[4] B65D *45/28, 43/16*
U.S. Cl. 220—305 14 Claims



1. A boiler penthouse access door comprising

a door frame defining an entranceway through a wall of a boiler penthouse and having a sealing gasket on an exterior face thereof around the perimeter of said frame,

a door plate hingedly attached to said frame for swinging movement between closed and open positions relative to said entranceway,

releasable locking means on said frame and door plate whereby the door plate can be positively held substantially in engagement with said gasket, said door plate being inwardly warped adjacent to corners thereof and adjacent to corresponding corners of said frame, and

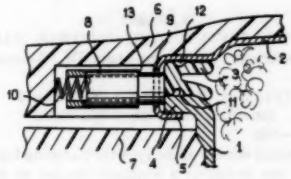
means carried by the door plate to apply inward pressure to the exterior of the door plate while the door plate is locked in the closed position to thereby substantially flatten the door plate adjacent to said inwardly warped corners for providing a tight seal between the interior of the door plate and said gasket around the perimeter of said frame.

4,685,587

PRESSURE COOKER EQUIPPED WITH A SAFETY DEVICE FOR PRODUCING CONTROLLED LEAKAGE OF THE SEALING GASKET

Christian Sebillotte, Selongey, France, assignor to Seb S.A., Selongey, France

Filed Jul. 23, 1986, Ser. No. 888,483
Claims priority, application France, Jul. 26, 1985, 85 11471
Int. Cl.[4] B65D *45/00*
U.S. Cl. 220—316 5 Claims



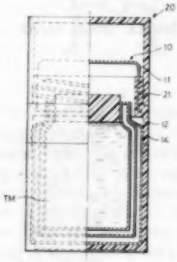
1. A pressure cooker constituted by a pressure vessel (1), a lid (2), a sealing gasket (3) between the pressure vessel and the lid, guide ramps (4, 5) formed respectively on the edge of the pressure vessel and on the edge of the lid and adapted to cooperate with each other in order to provide a bayonet closure system, a device having the function of producing controlled leakage of the sealing gasket (3) and provided with a push-rod (8) mounted on the lid (2) so as to pass through a lateral opening (9) of said lid and to exert a thrust on the sealing gasket (3) under the action of restoring means (10), said push-rod (8) being retained by a guide ramp (4) of the pressure vessel when the lid is completely closed, the function of said push-rod (8) being to thrust the gasket (3) towards the interior of the pressure vessel when the lid is incompletely closed and when said push-rod is no longer retained by said guide ramp (4), wherein the sealing gasket (3) has at least one groove (11) parallel to one edge of said gasket and formed on one gasket face adjacent to that edge of the pressure vessel which is provided with said guide ramps (4), the position of said groove (11) with respect to the edge of the pressure vessel being such that when the lid is completely closed, said groove (11) is applied against the guide ramps (4) which project externally of the pressure vessel (1) and communicates with the external atmosphere in the intermediate zones between the ramps, said groove (11) being intended to communicate with the interior of the pressure vessel when the lid is incompletely closed and when the sealing gasket (3) is thrust by the push-rod (8) towards the interior of said pressure vessel.

4,685,588

PORTABLE CONTAINER FOR FOOD OR DRINK TO BE WARMED OR COOLED

Hiroshige Kobayashi, 6-61, Shibayama, Funabashi City, Chiba Prefecture, Japan

Filed Jul. 7, 1986, Ser. No. 882,741
Claims priority, application Japan, Dec. 6, 1985, 60-273389
Int. Cl.[4] F28D *1/06*
U.S. Cl. 220—428 8 Claims



1. A portable container comprising;

an inner cup having a thermally conductive bottom portion to contain food or drink therein, and an outer cup of thermally insulative material to be filled with a heat exchange medium, said two cups being adapted to be engaged with each other so that said bottom portion of said inner cup may be dipped in said exchange medium;

said inner cup has external threads and said outer cup has internal threads so that said outer cup threadedly engaged with said inner cup to completely receive said inner cup therein may engage with the external threads of said thermos with a remainder portion of said internal threads, and

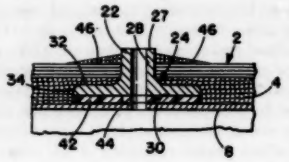
the assembly of the engaged inner and outer cups are engaged with a thermos in the inverse position.

4,685,589

COMPOSITE PRESSURE VESSEL INCLUDING A FLUID PORT DIRECTLY THROUGH THE COMPOSITE SIDE WALL STRUCTURE

Terry L. Benton, Portage, Mich., assignor to Pneumo Corporation, Boston, Mass.

Filed Mar. 28, 1986, Ser. No. 845,841
Int. Cl.[4] F16L *9/00*
U.S. Cl. 220—465 9 Claims



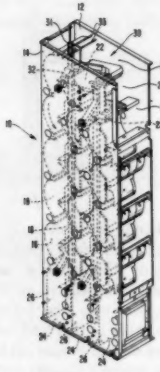
1. A composite pressure vessel comprising a side wall structure of composite material, a liner member lining the interior of said side wall structure, and a fluid port through said side wall structure and liner member, said fluid port comprising a porting fitting internally located in said side wall structure, said porting fitting including a tubular portion extending radially through said side wall structure from the exterior of said side wall structure toward the interior thereof, and a flange portion at the radial inner end of said tubular portion, said flange portion being located within said side wall structure radially outwardly spaced from said liner member to provide a void space between said flange portion and said liner member, and seal means completely filling said void space between said flange portion and liner member except for a porting hole extending through said seal means, porting fitting and liner member.

4,685,590

ARTICLE DISPENSING MECHANISM FOR VENDING OF CYLINDRICAL ARTICLES

Hideo Negishi, and Mikiya Wakabayashi, both of Gunma, Japan, assignors to Sanden Corporation, Japan

Filed Aug. 27, 1985, Ser. No. 769,963
Claims priority, application Japan, Aug. 27, 1984, 59-128621[U]
Int. Cl.[4] B65H *31/20*
U.S. Cl. 221—241 15 Claims



1. In an article dispensing mechanism for a vending machine including a pair of side plates facing one another at a predetermined spacing and at least one pair of serially cusp-shaped vertical panels disposed transversely between said side plates to define a serpentine track, an upper open end of said serpentine track being connected to an article loading space and a lower open end of said serpentine track being connected to an article dispensing space, the improvement comprising;

said serpentine track being provided with a horizontal length adjusting device including a spacer extending vertically within said serpentine track, a movable plate and a guide plate;

said movable plate being connected to an upper portion of said spacer in a manner permitting sliding motion of said movable plate parallel to said side plates; and

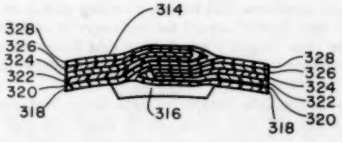
said guide plate extending across said loading space and engaged with said movable plate for guiding the movement of said movable plate, said movable plate and said spacer being movable together in a direction longitudinally between said side plates to define the horizontal length of said serpentine track and said article loading space.

4,685,591

DISPENSING TUBE PACKAGE

Suzanne E. Schaefer, and John P. Eckstein, both of Neenah, Wis., assignors to American Can Company, Greenwich, Conn.

Filed Dec. 28, 1984, Ser. No. 687,526
Int. Cl.[4] B65D *35/08*
U.S. Cl. 222—107 60 Claims



1. In combination, a tube made from a multiple layer sheet material and a covering polymeric strip, said sheet material comprising:

(a) a first layer of high density polyethylene;

(b) a second layer, the composition of said second layer being chosen from the group consisting of polymers and adhesives; and

(c) a third primer layer of polyethylene imine,

said third primer layer being between said first and second layers, said sheet material having been formed into a tube having a lap seam extending along the length of said tube, said first layer being disposed toward the inside of said tube, all the layers of said sheet material being firmly adhered to each other;

said tube having an inner surface facing the interior of said tube and an outer surface on the exterior of said tube; said polymeric strip covering said lap seam on said interior surface of said tube and not extending between said lap seam, said strip comprising polyethylene having a resin density of at least 0.950.

4,685,592

PUMPING SYSTEM WITH CONTROL VALVE

John A. Vanderjagt, 1395 Glen Oaks Dr., Memphis, Tenn. 38117

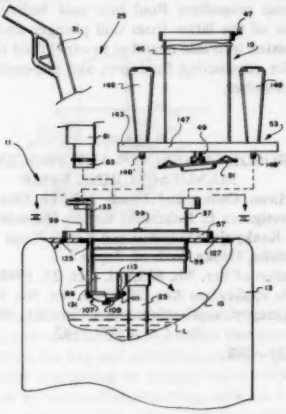
Filed Nov. 29, 1985, Ser. No. 803,013
Int. Cl.[4] B67D *5/06*; F04B *49/02*
U.S. Cl. 222—148 10 Claims

1. In a pumping system of the type for pumping liquid chemicals and the like including a container having an interior for holding liquid chemicals and the like, positive displacement pump means including an outlet chamber, intake pipe means extending into the interior of said container and communicated with said pump means for providing a conduit for liquid chemicals and the like to be pumped by said pump means from the interior of said container to said outlet chamber, and dispensing means including a hose having one end thereof communicating

with said outlet chamber and nozzle means at the other end of said hose; the improvement in said pumping system comprising a valve interposed in said system between said outlet chamber and said interior of said container, said valve including:

(a) a hollow sleeve member having an upper end and a lower end, said upper end being communicated with said outlet chamber and said lower end communicated with said interior of said container;

(b) a valve member movably mounted in said sleeve member and being selectively placeable in a free condition in which said valve member is relatively unrestrained between upper closed and lower opened positions of said valve and placeable in restrained opened conditions of said valve;



(c) spring means urging said valve member towards said upper closed positions; and

(d) control means fixedly coupled to said valve member for holding said valve member selectively in said restrained opened conditions against the force of said spring means to control the liquid chemicals and the like passing through said hollow body member and to control the fluid pressure in said system.

4,685,593

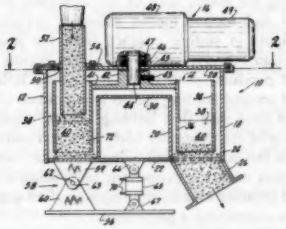
FEEDER FOR HIGHLY ABRASIVE MATERIALS

Isaias Loukos, Rte. 2, P.O. Box 226 F-2, Knoxville, Md. 21758

Filed May 8, 1985, Ser. No. 732,180

Int. Cl.[4] B67D *5/64*

U.S. Cl. 222—168.5 **15 Claims**



1. A feeder including an annular housing, an annular impeller disposed within said housing, said impeller including spaced apart concentric cylindrical members,

a plurality of fin members disposed in equi-spaced relation and extending between said cylindrical members to define a plurality of compartments of equal capacity within said impeller,

said fin members extending upwardly from the lower edges of the cylindrical members and having a height substantially less than that of the cylindrical members,

a feed spout extending downwardly through said housing and into the space between said cylindrical members and terminating in proximity to the upper edges of said fin members,

hub means adjacent the upper end of said impeller and above the lower end of said spout,

shaft means extending downwardly through said housing and engaging said hub means for rotating said impeller,

said housing having a lower wall portion,

an opening formed in said lower wall portion and below said impeller, said opening being spaced from said feed chute.

4,685,594

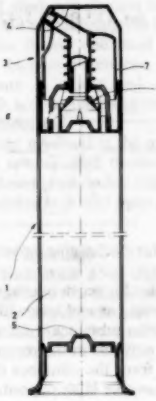
DISPENSER FOR PASTE-LIKE PRODUCTS

Manuel Czech, Schillerstr. 12, D-8405 Donaustauf, Fed. Rep. of Germany

Filed Jul. 3, 1986, Ser. No. 881,693

Int. Cl.[4] G01F *11/04*

U.S. Cl. 222—182 **17 Claims**



1. A dispenser for paste-like products, comprising a container for containing a product supply, said container being open at a bottom end thereof, a follower piston closing the bottom of said container, means at the upper end of said container defining a pump chamber, a dispenser piston slidable in said pump chamber in one direction for drawing product into the pump chamber from the container and in the opposite direction for forcing product out of the pump chamber, and a manually operable actuator cap for moving said dispenser piston, said dispenser being characterized by:

(1) said actuator cap having an actuator tube portion fixed thereon that extends in said directions and is movable between defined limits in said directions;

(2) said dispenser piston having a guide tube portion fixed thereon which is in coaxial slidingly guided sealing relationship with said actuator tube portion and the interior of which is communicated with the pump chamber through the dispenser piston to cooperate with the actuator tube portion in providing an outlet passage for flow of product out of the pump chamber;

(3) said tube portions having cooperating abutments defining a lost motion connection between them that permits said actuator tube portion to move relative to said guide tube portion during an initial stage of movement of the actuator

tube portion from each of said limits to the other but otherwise constrains said guide tube portion to move in unison with the actuator tube portion;

(4) a sealing cap fixed on the container at said upper end thereof and through which at least one of said tube portions extends with a slidable sealing fit, said sealing cap defining an inlet passage which is communicated with the interior of the container and in which product flows from the container towards said pump chamber; and

(5) at least one of said tube portions having a hole therethrough

(a) through which said pump chamber is communicated with said inlet passage when said tube portions are moving in unison in said one direction and

(b) which is sealingly closed by a portion of the other of said tube portions when the tube portions are moving in unison in said opposite direction.

4,685,595

HAND-OPERATED IMPLEMENT FOR DISCHARGING PASTY SUBSTANCES

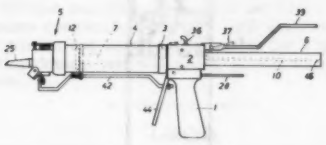
Wilhelm Segatz, Zell, Fed. Rep. of Germany, assignor to ARA-Werk Kraemer GmbH & Co., Fed. Rep. of Germany

Filed Mar. 7, 1985, Ser. No. 709,338

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1984, 3409724

Int. Cl.[4] B67D *5/42*

U.S. Cl. 222—326 **25 Claims**



1. An implement for discharging a pasty substance, comprising:

a reception cylinder for receiving the substance, the reception cylinder having an end face with a discharge opening through which the substance is forced;

a plunger axially movable in the reception cylinder toward the end face to force the substance through the discharge opening, and movable in an opposite direction to retract;

a gas spring connected to the plunger and operable to urge the plunger toward the end face, the gas spring being resetable by compression in said opposite direction; and,

a manually operable valve on the end face of the reception cylinder, operable to open and close the discharge opening.

4,685,596

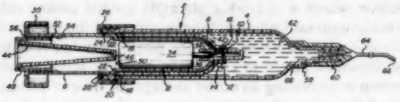
FLUID DISPENSER

Harley H. Mattheis, Verona, N.J., assignor to Risdon Corporation, Naugatuck, Conn.

Filed Apr. 23, 1986, Ser. No. 855,165

Int. Cl.[4] B67D *5/42*

U.S. Cl. 222—389 **15 Claims**



1. A device for dispensisng fluid comprising:

a hollow piston slidably mounted in a cylinder and defining therewith a chamber for receiving fluid;

valve means in said cylinder for receiving fluid into and dispensing fluid from said chamber;

a plunger having one end detachably mounted in said piston;

a container having valve means for dispensing propellant fluid, said valve means being normally biased to a closed position, said container being slidably mounted within said plunger;

means for locking said plunger and said cylinder in fluid sealing engagement;

detachment means for releasing said piston from said plunger;

means for actuating said valve means on said container to dispense propellant fluid into said hollow piston after release of the latter from said plunger and thereby bias said piston into said chamber to expel fluid therefrom; and

means for conducting fluid into, and dispensing fluid from, said chamber.

4,685,597

AEROSOL CONTAINER AND PROCESS FOR MANUFACTURING SAME

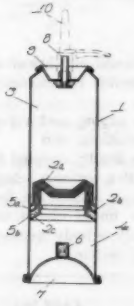
Katsumi Hirao, Osaka, and Toshio Miyake, Okayama, both of Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama and Kanpe Katei Toryoo Kabushiki Kaisha, Osaka, both of, Japan

Continuation of Ser. No. 663,972, Oct. 23, 1984, abandoned. This application Aug. 25, 1986, Ser. No. 900,254

Claims priority, application Japan, Nov. 12, 1983, 58-213039

Int. Cl.[4] B67D *5/42*

U.S. Cl. 222—389 **5 Claims**



1. An aerosol container structure, comprising:

(a) a container body in cylindrical form having at its different ends a product spout and a propellant inlet both openable and closable;

(b) a plate member, comprising at least one plate slidable along the inside wall of the container body and having first and second means about its periphery for holding sealants in sliding contact with the inside wall of the container body, said first holding means being closer to said product spout than said second holding means and said second holding means being closer to said propellant inlet than said first holding means, separating the inner space of the container body into two sections, one section with the pocket spout being a product area and the other section with the propellant inlet being a propellant area, said product area containing a product and said propellant area containing a propellant;

(c) a first sealant comprising a composition selected from the group consisting of water, polyol and mixtures thereof and having physical properties essentially identical to those of the product, the first sealant being placed in the first holding means; and

(d) a second sealant comprising a composition selected from the group consisting of water, polyol and mixtures thereof

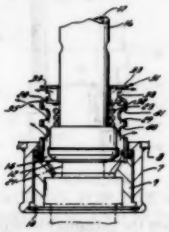
and forming an effective gas-barrier to the propellant, the second sealant being placed in the second holding means.

4,685,598

KEG VALVE ASSEMBLY IMPROVED FOR FAST FILLING

James E. Nezworski, Waukesha, Wis., assignor to The Perlick Company, Milwaukee, Wis.

Filed Sep. 2, 1986, Ser. No. 902,632
Int. Cl.[4] B65D *83/06*; B65B *1/04*
U.S. Cl. 222—400.7 **12 Claims**



1. In a valve assembly for normally sealing a keg, of the type cooperable with a detachable tapping coupler that provides for drawing liquid from the keg and admitting pressure gas into it, said valve assembly comprising an annular valve body detachably securable in an outwardly projecting neck on a keg, an annular gas valve member cooperating with the valve body to define an annular gas passage and movable in inward and outward directions respectively from and to an engagement with the valve body that seals the gas passage, a siphon tube through which liquid passes out of the keg and which has an axis that coincides with axes of the valve body and the gas valve member, said siphon tube being secured to said gas valve and projecting in said inward direction therefrom, a coiled spring surrounding the siphon tube to bias the gas valve towards said engagement, and a spring retainer having a cylindrical wall which surrounds the spring in coaxial radially spaced relation to the siphon tube and which has an outer end that is secured to said valve body and an opposite inner end, said spring retainer further having abutment means on said inner end of the cylindrical wall against which said spring reacts,

debouchment controlling means for minimizing turbulence of liquid forced through said gas passage and entering a keg in which the valve assembly is installed and which has its neck lowermost, said debouchment controlling means being characterized by: deflection means connected with a portion of the valve assembly that is spaced in said inward direction from said valve body and defining surface areas which are substantially normal to said axes and which face substantially in said outward direction, said surface areas

(1) being spaced in said inward direction from circumferentially extending edge portions of said cylindrical wall at said inner end thereof to cooperate with those edge portions in defining outlets,

(2) having substantially regular circumferential distribution around the siphon tube, and

(3) extending radially from the siphon tube substantially across the annular space between it and said cylindrical wall,

whereby liquid that flows in said outward direction in said annular space is deflected to flow through said outlets and across said edge portions of the cylindrical wall in directions substantially radial to said axes.

4,685,599

NOVELTY WRISTWATCH

Cheryl Israel, and Melissa M. Morgan, both of Providence, R.I., assignors to Hasbro, Inc., Pawtucket, R.I.

Filed Sep. 15, 1986, Ser. No. 907,597
Int. Cl.[4] A44C *5/00*
U.S. Cl. 224—170 **7 Claims**

1. A novelty wristwatch comprising:

(a) a strap element detachably securable on a wrist of a wearer;

(b) an enlarged three-dimensional plush toy element on said strap element, said plush toy element being of the plush-toy-type construction and defining the head portion of an imaginary character figure, said head portion having a mouth and being hingeable between a closed position wherein said mouth is closed and an open position wherein said mouth is open and being releasably securable in said closed position; and

(c) a timepiece element mounted in the mouth of said head portion so that it is concealed therein when said head portion is in said closed position but visible to said wearer when said head portion is in said open position.

4,685,600

CARTRIDGE CARRIER AND DISPENSER

Donald L. Reuschel, 3724 38th St., Hamilton, Mich. 49419

Continuation of Ser. No. 660,410, Oct. 12, 1984, abandoned. This application Jun. 16, 1986, Ser. No. 874,594
Int. Cl.[4] F42B *39/02*
U.S. Cl. 224—203 **11 Claims**

1. A firearm cartridge carrier for cartridges of the type having a generally cylindrical body and two ends, said carrier comprising:

a tube terminating in a loading end and a dispenser end and adapted to receive a plurality of cartridges therebetween in end-to-end relation,

support means on said tube for supporting said tube on the body of a person with the loading end higher than the dispenser end for providing gravity feed of said cartridges,

said tube having a cartridge stop means at the dispenser end and a cartridge input opening at the loading end,

a cartridge dispenser opening in the wall of said tube above said stop means,

manually actuable deflecting means comprising a finger opening in the wall of said tube opposite said dispenser opening for deflecting one end of the bottom cartridge so that said one end extends laterally through said dispenser opening and obliquely of said tube,

and retaining means for yieldingly holding the other end of said bottom cartridge within the tube when said one end is deflected by said manually actuable deflecting means,

whereby said one end of said bottom cartridge may be grasped by said person's hand to remove said bottom cartridge through said dispenser opening.

4,685,601

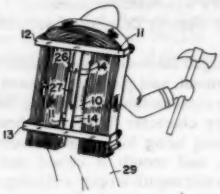
FIRE HOSE BACK PACK

Charles C. Riddling, 6362 Bahaia Rd., Green Cove Springs, Fla. 32043

Filed Jun. 23, 1986, Ser. No. 877,136

Int. Cl.[4] A45F *3/08*; A47G *29/00*

U.S. Cl. 224—261 **12 Claims**



1. A fire hose back pack releaseably attachable to a cylindrical air tank, said back pack comprising a central vertical frame member and a pair of horizontal arm members attached respectively to each end of said vertical member medially of said arm member, a pair of spaced circular spring clip members attached to said vertical member respectively, adjacent to and between said horizontal arm members, each said spring clip member being adapted to automatically grip around a compressed air cylinder upon being pressed against said cylinder, and a pair of flexible wrap-around fastening means attached respectively to the outer ends of one of said horizontal arms and adapted to encircle portions of fire hose lying between said ends and said spring clip members.

4,685,602

PLASTIC-MOLD CUTTING APPARATUS USING SUPERSONIC WAVES

Tomio Hama, Okaya, Japan, assignor to Kabushiki Kaisha Harmo, Tokyo, Japan

Filed Apr. 4, 1985, Ser. No. 719,924

Claims priority, application Japan, Apr. 9, 1984, 59-71529

Int. Cl.[4] B26F *3/00*

U.S. Cl. 225—93 **5 Claims**

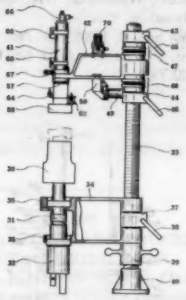
1. A plastic mold cutting apparatus for cutting plastic mold by supersonic waves, comprising:

a base having an open surface,

means for generating supersonic waves connected to the base, said means for generating supersonic waves including a supersonic oscillator, and a horn connected to the oscillator and having an upper end, said horn extending through the base so that the upper end of the horn is located adjacent to the upper surface of the base,

means for pressing the plastic mold onto the upper end of the horn, said pressing means including a pressing element, a holder connected to the pressing element for holding at least a part of the plastic mold to be cut and a first moving device for vertically moving the pressing element with the holder, and

means for supporting the pressing means including rails connected to the base, a support element connected to the rails and supporting the pressing means, and a second moving device connected between the base and the support element for moving the support element relative to the base, whereby after the plastic mold to be cut is placed on the upper end of the horn, said second moving device



is actuated to locate the pressing element above the plastic mold, and then the first moving device is actuated to move the pressing element for holding the plastic mold between the pressing element and the horn, the plastic mold held between the pressing element and the horn being cut by the supersonic waves generated by the oscillator.

4,685,603

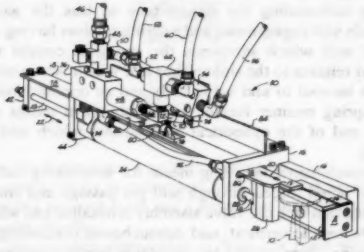
FASTENER POSITIONING DEVICE

Edward L. Thomas, 7519 Dalebrook Rd., Independence, Ohio 44131

Filed Apr. 2, 1986, Ser. No. 847,193

Int. Cl.[4] B27F *7/02*

U.S. Cl. 227—6 **23 Claims**



1. An apparatus for delivering fasteners to a hamxering device, each of said fasteners having a metal-based composition and a shank extending from a head thereof, said apparatus comprising:

a support frame;

an elongated member fixedly received on said support frame;

magnet means, fixedly supported along a longitudinal portion of said elongated member, for magnetically engaging said fasteners in slidable relationship with said member along at least a portion of the length thereof;

tube feed means for supplying said fasteners in a head-up, vertical disposition in seriatim to a first point relative said elongated mexber where their shanks are respectively engaged by said magnet means, said tube feed means approaching said point at an angle to the length of said elongated member; and

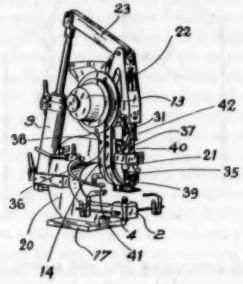
reciprocating means for controllably sliding individual fasteners one at a time along said elongated member, is said vertical disposition with the shanks thereof engaged by said magnet means, from said first point to a hammering position relative a hammering device, while interrupting supplying of susequent fasteners to said first point by said tube feed means, whereby one fastener at a time is fed to said first point and then subsequently conveyed to said hammering position in a desired orientation for hammering.

4,685,604

MULTI-USE MACHINE FOR THE APPLICATION OF SMALL METALLIC AND NON-METALLIC WORKPIECES OR ITEMS AND WITH TOTAL INTERCHANGEABILITY OF EQUIPMENT AND RELATED FITTINGS

Pierino Falzoni, Cilavagna, Italy, assignor to Officina Meccanica Fratelli Falzoni S.d.f., Cilavegna, Italy

Continuation-in-part of Ser. No. 357,228, Mar. 11, 1982, abandoned. This application Apr. 15, 1985, Ser. No. 723,038
Claims priority, application Italy, Mar. 18, 1981, 20400 A/81
Int. Cl.[4] A41H *37/10*
U.S. Cl. 227—18 **4 Claims**



1. A multi-purpose machine for the application of metallic and non-metallic workpieces which can be positioned on a pedestal, table or in a processing line, said machine comprising:

(a) a head including a fixed tool holder and a movable tool holder;

(b) an exchangeable pair of associated tools held by said fixed and movable tool holders, said movable tool holder carrying a punch and said fixed tool holder carrying an associated matrix;

(c) means for moving said movable tool holder towards said fixed tool holder;

(d) a detachable, single drop type feeder including a rivet container, a feed channel, and means for controlling the fall of a single rivet comprising a rotatable pin transversely disposed in said feed channel having a longitudinal groove therein, and means operatively connecting said rotatable pin with said movable tool holder to cause said pin to rotate and allow the passage thereby of a rivet during the approaching phase of the movable tool holder towards the fixed tool holder; and

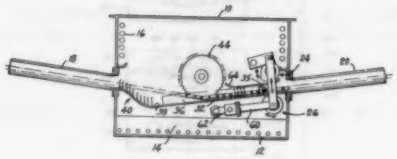
(e) a rivet holder detachably fixed to said head opposite said feed channel and having a centering yoke.

4,685,605

CONTINUOUS SOLDER SYSTEM

Donald J. Spigarelli, Carlisle; Douglas J. Peck, North Andover, and James L. Finney, Hudson, all of Mass., assignors to The HTC Corporation, Concord, Mass.

Continuation of Ser. No. 614,288, May 25, 1984, abandoned. This application Jan. 9, 1986, Ser. No. 872,370
Int. Cl.[4] B23K *3/06*
U.S. Cl. 228—37 **3 Claims**



1. A vapor processing system comprising

a vessel for containing a processing vapor,

means for heating electronic liquid contained within said vessel to establish a zone of saturated vapor,

means for conveying work product through the saturated vapor zone,

horizontally extending nozzle means for directing a stream of molten solder against a surface of work product as it is conveyed through the saturated vapor zone, and

means for varying the position of said directing means including

conduit means for supplying molten solder to said nozzle means, said conduit means being connected at one end to said nozzle means and pivotally supported at the other end,

vertical link means connected at one end to said one end of said conduit means and including aperture means at the other end, and

yoke means having means for cooperating with said aperature means for raising or lowering said vertical link means whereby the vertical location of said nozzle means can be changed.

4,685,606

OXIDE-FREE EXTRUDED THERMAL JOINT

Ephraim B. Flint, Garrison; Peter A. Gruber, Mohegan Lake; Ronald F. Marks, Ossining, all of N.Y.; Graham Olive, San Jose, Calif., and Arthur R. Zingher, White Plains, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 9, 1986, Ser. No. 861,696
Int. Cl.[4] B23K *31/02*
U.S. Cl. 228—123 **8 Claims**

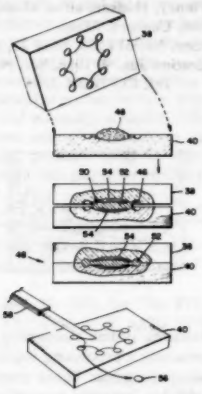
1. A method of attachment of a heat-conductive element to an electric circuit chip comprising the steps of:

placing a charge of a thermally conductive alloy in a chamber assembly;

heating the alloy to approximately the liquidus temperature thereof to facilitate extrusion of the alloy;

pressing the alloy within said chamber assembly to extrude a portion of the alloy away from the site of said charge, any oxide present on a surface of the charge remaining in the vicinity of the charge during extrusion of the alloy, an extruded portion being free of the oxide;

positioning said extruded portion between said heat-conductive element and said chip; and



forcing said heat-conductive element against said chip to extrude the alloy of said portion along an interface between said element and said chip.

4,685,607

NITRIDE CERAMIC-METAL COMPLEX MATERIAL AND METHOD OF PRODUCING THE SAME

Hiromitsu Takeda, Tokyo; Masako Nakahashi, Kawasaki; Makoto Shirokane, Tokyo; Akihiko Tsuge, Yokohama, and Takao Suzuki, Ichikawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 17, 1985, Ser. No. 735,106

Claims priority, application Japan, May 21, 1984, 59-102021; Jul. 24, 1984, 59-152003; Feb. 6, 1985, 60-20072

Int. Cl.[4] B23K *20/14*

U.S. Cl. 228—193 **15 Claims**

1. A method of producing a nitride ceramic-metal complex material, comprising the steps of:

bringing a metallic material selected from the group consisting of a metal rich in reactivity with a precursor to nitride and an alloy of said metal into contact with the surface of a nitride ceramic material; and

heating under vacuum the nitride ceramic material which is kept in contact with the metallic material so as to dissociate the surface of the nitride ceramic material into nitrogen and a precursor to nitride, thereby alloying the dissociated precursor to nitride to react with the metal or alloy thereof so as to achieve bonding between the nitride ceramic material and the metallic material.

4,685,608

SOLDERING APPARATUS

Erich F. Kujas, Philadelphia, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Oct. 29, 1985, Ser. No. 792,472

Int. Cl.[4] B23K *31/02, 35/24;* **H05B** *5/00, 6/64*

U.S. Cl. 228—227 **15 Claims**

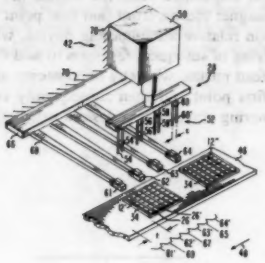
1. Apparatus for soldering a link carried by an element, one of said element and link carrying solder which, when melted, bonds the link to the abutting element, said apparatus comprising:

induction heating means;

a heat radiating susceptor spaced from and adapted to be inductively heated by the induction heating means;

element support means including means adapted for carrying said element, link and solder to be melted; and

conveying means for carrying said support means spaced from the susceptor at that distance and moving at that rate which permits the susceptor to radiantly heat said solder



causing the solder to melt as it moves along a given path through a region heated by said susceptor.

4,685,609

APPARATUS COMPRISING PLANAR ELEMENTS WHICH MAY BE ASSEMBLED TOGETHER TO FORM A STRUCTURE

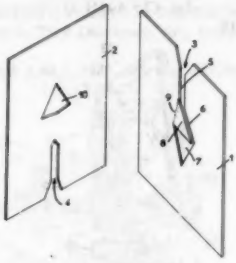
Hubert Ferrari, Le Val St André , France, assignor to Societe Coninentale du Carton Ondule Socar, Saint Mande, France

Filed May 30, 1986, Ser. No. 869,092

Claims priority, application France, Aug. 21, 1985, 85 12594

Int. Cl.[4] B65D *5/48*

U.S. Cl. 229—15 **7 Claims**



1. Apparatus comprising first and second planar elements which may be assembled together to form a structure, each element having a slit which extends to an edge of the respective element and into which the other element may be introduced, the slits having linear portions which are aligned in a predetermined direction when the elements are so assembled, the slit of the first element being formed to provide a flap which extends transversely with respect to said predetermined direction and which is pivotable about a folding line which extends obliquely with respect to said predetermined direction, said flap having an inner flap edge, inner with respect to the slit of the first element, which extends at a first angle with respect to said predetermined direction, the second element having an aperture in which the flap is engaged when the elements are assembled, said aperture having a V shaped aperture edge, with the base of the V being aligned with the slit in said second element along said predetermined direction, and the legs of the V extending away from the slit, and one leg of the V forming an interference aperture edge which extends at a second angle, different from said first angle, with respect to said predetermined direction, with said flap edge being next to said interference aperture edge but angled with respect thereto because of the different first and second angles, and wherein movement of said elements from an orthogonal position to a position in which they lie against one another results in said flap edge

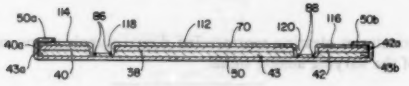
contacting and engaging said interference aperture edge to prevent the flap from pivoting freely about the folding line to prevent said first and second planar elements from becoming disengaged from each other.

4,685,610

CONTAINER AND METHOD OF MAKING A CONTAINER WITH INTEGRAL BOTTOM PANEL AND SIDE PANELS

Leewood C. Carter, and Robin P. Neary, both of Warren, N.J., assignors to Book Covers Inc., Newark, N.J.

Filed May 19, 1986, Ser. No. 864,498
Int. Cl.[4] B65V 5/35
U.S. Cl. 229—23 R **21 Claims**



1. An integral box component for use in assembling a box having a bottom panel, and first and second side panels, said box component comprising:

a primary base sheet of water-resistant paperboard material having a top surface, a bottom surface, and first and second longitudinally-extending outer edges;

three separate sections of water-resistant paperboard material adhered to the top surface of said primary sheet to define a center section and first and second side sections spaced apart from said center section, the outer longitudinal edges of said first and second side sections being substantially co-extensive with said first and second outer longitudinal edges of said primary base sheet;

a first folding section between said center section and said first side section and a second folding section between said center section and said second side sheet;

a sheet of bottom wrap protective material covering the bottom surface of said primary base sheet and wrapped around the co-extensive outer edges of said primary base sheet and said side sections and overlying portions of the top surface of each of said first and second side sections;

a sheet of top wrap protective material covering the top surfaces of said center section and said first and second side sections and covering the top surface of said primary base sheet in said first and second folding sections;

said bottom wrap, said top wrap, and said primary base sheet in said first folding section cooperating to define a rigid first folding panel and said bottom wrap, said top wrap and said primary base sheet in said second folding section cooperating to define a rigid second folding panel; and

ventilation holes formed along the length of said first and second folding panels.

4,685,611

BUTTERFLY VALVE CONSTRUCTION HAVING A COMPOSITE SEAT

William B. Scobie, and Paul A. Yohner, both of Houston, Tex., assignors to Keystone International, Inc., Houston, Tex.

Filed Nov. 26, 1986, Ser. No. 935,522
Int. Cl.[4] F16K 1/226
U.S. Cl. 251—306 **19 Claims**

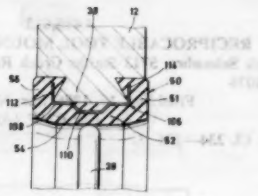
12. A valve seat for a butterfly valve comprising:

an annular, resilient member having an annular web and first and second, spaced, radially outwardly extending annular flanges depending from said web, said web and said flanges defining a radially outwardly opening annular channel;

a reinforcement means bonded to said resilient annular member, said reinforcement means comprising:

a plurality of circumferentially spaced, generally axially extending spacer elements, said spacer elements being bonded to said web and extending generally around said annular member;

a plurality of first circumferentially spaced, radially outwardly extending leg elements, said first leg elements depending from a first end of said spacer elements, said first leg elements being in said first flange and extending generally around said annular member; and



a plurality of second circumferentially spaced, radially outwardly extending leg elements, said second leg elements depending from a second end of said spacer elements, said second leg elements being bonded to said second flange and extending generally around said annular member;

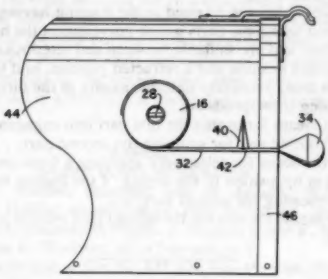
said spacer elements and said first and second leg elements being made of a material that is more rigid than the material of said resilient annular member.

4,685,612

MAILBOX INDICATOR

Anthony J. Rascov, 4303 Robasco Rd., Cincinnati, Ohio 45244

Filed Jan. 16, 1986, Ser. No. 819,418
Int. Cl.[4] B65D 91/00
U.S. Cl. 232—35 **9 Claims**



1. An indicator for a conventional rural mailbox having a conventional end door shiftable between opened and closed positions, said indicator comprising an elongated resilient rectilinear member having a first end formed into a plurality of coiled coplanar convolutions terminating in an endmost portion located centrally within said convolutions and coplanar therewith, said indicator having a second end, an enlarged element affixed to said second end, means to mount said endmost portion of said first indicator end to a first side of said mailbox such that said indicator normally extends substantially vertically with respect to said mailbox with said enlarged element above said mailbox, said coiled first end of said indicator biasing said indicator to said vertical position, a laterally extending buttress on said first side of said mailbox, said buttress having a lower horizontal ledge, said indicator being shiftable against the action of said coiled second end thereof to a substantially horizontal position, said indicator being engageable beneath said buttress horizontal ledge to maintain it in said substantially horizontal position, said enlarged element, when said indicator is in said horizontal position, being located forwardly beyond said mailbox door and lying partially within the

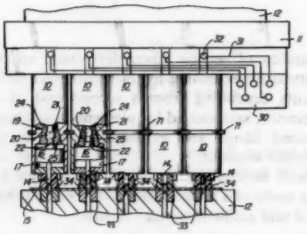
path of travel of said mailbox door from its closed to its open position, whereby when said indicator is in said horizontal position and said door is shifted from said closed to said open position, said door will engage said enlarged element and shift said indicator laterally by an amount sufficient to release said indicator from beneath said buttress ledge, causing said indicator to return to its normal vertical position under the urging of said coiled first end.

4,685,613

RECIPROCABLE TOOL MOUNTING MODULE

Frank Schambre, 5713 Smiths Creek Rd., Smith Creek, Mich. 48074

Filed Sep. 16, 1986, Ser. No. 908,405
Int. Cl.[4] B26F *1/04*
U.S. Cl. 234—131 **20 Claims**



1. A module for selectively deploying a reciprocable tool to selectively enable the tool to perform work upon a workpiece when reciprocated by a ram of a press comprising:
- a housing attached to the ram of the press;
- a reciprocable tool mounted for movement axially relative to the housing;
- a telescopic linkage retained in the housing having first and second telescopic parts which interconnect the housing to the tool and are shiftable between and interlockable in an extended position and a retracted position, said telescopic parts being relatively shiftable axially in the direction the housing is reciprocated;
- biasing means for urging the first part into engagement with the housing and for gripping the second part;
- operator means for selectively applying a force on the first part in opposition to the urging of the biasing means and for releasing the second part; and
- shifter means for moving the second part relative to the first part.

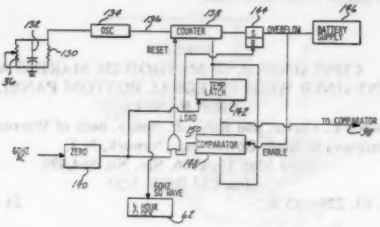
4,685,614

ANALOG TO DIGITAL CONVERSION EMPLOYING THE SYSTEM CLOCK OF A MICROPROCESSOR, THE CLOCK FREQUENCY VARYING WITH ANALOG INPUT

Michael R. Levine, Ann Arbor, Mich., assignor to Honeywell, Inc., Minneapolis, Minn.

Division of Ser. No. 579,409, Feb. 13, 1984, Pat. No. 4,531,064, which is a division of Ser. No. 350,522, Feb. 19, 1982, Pat. No. 4,469,274, which is a division of Ser. No. 153,343, May 27, 1980, Pat. No. 4,335,847. This application May 9, 1985, Ser. No. 732,436
Int. Cl.[4] H03K *13/02*; H05B *1/02*; G06F *15/20*
U.S. Cl. 236—78 D **9 Claims**

1. In an electronic system operative to generate a digital signal representative of a varying analog signal, and including a microprocessor operative to perform the analog to digtial conversion, the microprocessor including an oscillator circuit which controls the rate of operation of the microprocessor, means for connecting the varying analog signal to the oscillator input of the microprocessor so that the microprocessor operates at a rate dependent upon the varying analog signal, a counter operative to receive the outputs of the oscillator, and a constant frequency oscillator connected to the counter to clear the counter at regular intervals, the outputs of the



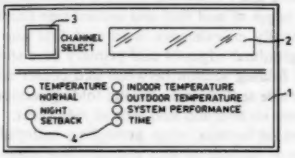
counter at clearing representing digital signals representative of the varying analog signal.

4,685,615

DIAGNOSTIC THERMOSTAT

Douglas R. S. Hart, 97 Six Point Road, Toronto, Ontario, Canada M8Z 2X3

Continuation-in-part of Ser. No. 682,082, Dec. 17, 1984, abandoned. This application Feb. 10, 1986, Ser. No. 827,716
Int. Cl.[4] G05D *23/00*
U.S. Cl. 236—94 **14 Claims**



1. A diagnostic thermostat for a building employing a single-zone heating system, comprising:
- first means for sensing indoor temperature,
- second means for sensing outdoor temperature,
- third means for cycling a furnace on and off in response to the level of the indoor temperature,
- fourth means for measuring time,
- fifth means for setting a desired indoor temperature,
- microprocessor means for determining, on the basis of signals from the first, second, third and fourth means, the heating performance of the building over a given period of time, and
- sixth means for displaying said heating performance expressed as a function of BTUs per degree day.

4,685,616

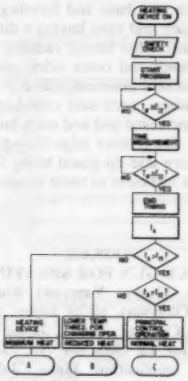
PROCESS AND SWITCHING MEANS FOR CONTROLLING HEAT PERFORMANCE IN A HEATING DEVICE

Friedrich Stein, Munich, Fed. Rep. of Germany, assignor to Webasto-Werk W. Baier & Co., Gauting, Fed. Rep. of Germany

Filed May 15, 1986, Ser. No. 863,436
Claims priority, application Fed. Rep. of Germany, May 18, 1985, 3517953
Int. Cl.[4] B60H *1/00*
U.S. Cl. 237—12 **22 Claims**

1. Process for controlling heating output of a heating device, particularly for use in vehicles, operating with a heat exchange medium, in which the heat output is controlled in dependence upon a control temperature and predetemined temperature

threshold values to produce at least full load high heat output, partial load low heat output and switched off operational states comprising the steps of determining a temperature gradient



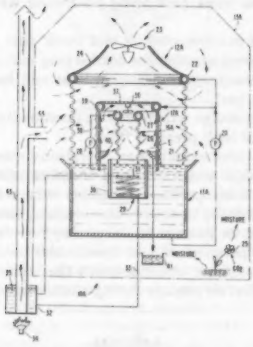
with respect to time during heating of the heat exchange medium between two of said temperature threshold values and, in dependence upon the slope of the temperature gradient, controlling the operational state of the heating device.

4,685,617

METHOD OF AND APPARATUS FOR CONDITIONING AIR IN ENCLOSURES

Gad Assaf, Rehovot, Israel, assignor to Geophysical Engineering Company, Wilmington, Del.

Filed Aug. 6, 1985, Ser. No. 762,859
Int. Cl.[4] F25D *17/06*
U.S. Cl. 237—81 **17 Claims**



1. A system for heating the air in an enclosure using low grade heat contained in a liquid whose temperature exceeds the temperature of the air in the enclosure comprising:

(a) an indirect contact heat exchanger having heat exchange surface means contacted by said liquid on the one side, and contacted by brine on the other side for effecting the transfer heat from said liquid to the said brine;

(b) a direct contact air brine heat exchanger associated with the enclosure including means for exchanging air between the enclosure and the air-brine heat exchanger; and

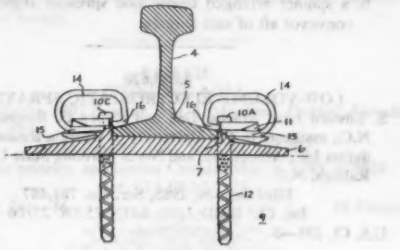
(c) means for exhanging brine between said direct contact heat exchanger and the other side of the heat exchange surface means of said indirect contact heat exchanger.

4,685,618

RAIL FASTENING SYSTEMS

Hartley F. Young, West Melton, Australia, assignor to Ralph McKay Limited, Maidstone, Australia

Filed Jan. 27, 1986, Ser. No. 823,010
Claims priority, application Australia, Feb. 1, 1985, PG 9103
Int. Cl.[4] E01B *9/30*
U.S. Cl. 238—310 **4 Claims**



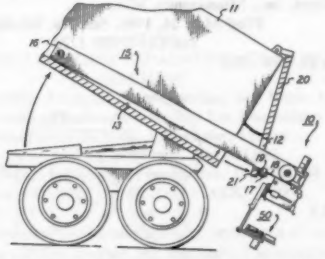
1. A rail fastening system comprising a wooden rail tie, a rail having a longitudinal axis, a rail plate positioned between the tie and the rail, two pairs of attachment means associated with each rail plate, each pair being located on opposite sides of the rail and each attachment means is alongside of the rail to secure the plate to the wooden tie, each attachment means including a recess, an end of each recess terminating in a surface of the attachment means lying adjacent to the rail, said attachment means further having located below said recess a spike portion extending through the plate and into the tie, and an elastic rail clamp associated with each pair of attachment means, the clamp having one portion lying on the rail flange and a base portion held within opposed facing recesses of the associated pair of attachment means wherein the rail plate incorporates an upstanding rib lying between the two attachment means adjacent the rail and the recess in each attachment means is arranged so that the base portion of the rail clamp abuts said rib of the rail plate before it abuts said surface of said attachment means at the end of the recess when said clamp is moved toward said rail in a direction at about right angles to said rail.

4,685,619

DUMP BODY SPREADER

Kenneth A. Harder, deceased, late of Arcadia, N.Y., by Phyllis J. Harder, administratrix, 2480 Zurich Rd., Newark, N.Y. 14513, assignors to Phyllis J. Harder; David K. Harder and Brenda K. Westcott, all of Newark, N.Y.

Continuation-in-part of Ser. No. 651,521, Sep. 17, 1984, Pat. No. 4,583,693. This application Sep. 18, 1985, Ser. No. 777,276
The portion of the term of this patent subsequent to Apr. 22, 2003, has been disclaimed.
Int. Cl.[4] A01C *19/00*; B60P *1/04*
U.S. Cl. 239—1 **32 Claims**



15. In a material spreader for a tiltable dump body having a tailgate that can pivot open and closed, the improvement comprising:

a. a conveyor pivotally connected to said tailgate so that a rear region of said conveyor extends through an opening in said tailgate to a spreader region aft of said tailgate, and a forward region of said conveyor extends into said dump body and rests on a bottom of said dump body so that said conveyor is movable with said tailgate as said tailgate pivots open and closed; and

b. a spinner arranged below said spreader region of said conveyor aft of said tailgate.

4,685,620

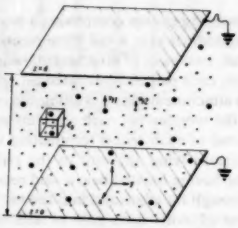
LOW-VOLUME ELECTROSTATIC SPRAYING

S. Edward Law, Athens, Ga., and Henry D. Bowen, Raleigh, N.C., assignors to The University of Georgia Research Foundation Inc., Athens, Ga. and North Carolina State University, Raleigh, N.C.

Filed Sep. 30, 1985, Ser. No. 781,487

Int. Cl.[4] B05D *1/06*; A01N *25/08, 25/06*

U.S. Cl. 239—3 **11 Claims**



1. A method for increasing the efficiency of electrostatic deposition of particulate matter on a surface, which comprises:

preparing a dispersion of electrostatically charged particles of an active material to be deposited on said surface, wherein said particles of active material have an average radius of r_{p1} and a total volume of V_{L1}, in a space adjacent to said surface which contains a dispersion of particles of an inert material, electrostatically charged with the same polarity as said particles of active material, wherein said particles of inert material have an average radius of r_{p2} and a total volume of V_{L2}, wherein $r_{p1} > r_{p2}$ and

$$\frac{V_{L2}}{V_{L1}} \geq 0.2.$$

4,685,621

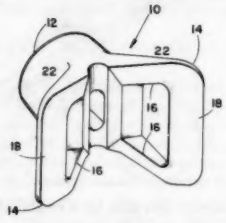
ACCUMULATION RESISTANT TIP GUARD

William C. Scherer, Minneapolis; Jimmy W. Tam, Shoreview, and Duane A. Luebeck, Blaine, all of Minn., assignors to Graco, Inc., Minneapolis, Minn.

Filed Mar. 24, 1986, Ser. No. 843,068

Int. Cl.[4] B05B *1/28*

U.S. Cl. 239—288 **15 Claims**



1. A tip guard for protection of an airless spray tip having a generally planar fan pattern with a spray axis, said tip guard comprising:

a base located adjacent said tip;

at least four vanes extending axially forwardly and radially outwardly from said base and forming at least first and second pairs, each said vane having a distal end, a substantially sharp inner edge facing radially inwardly toward said axis and inner and outer sides, said sides diverging outwardly from said inner edge; and

at least two crossbars, each said crossbar joining a pair of said vanes at said distal end and each said crossbar having a substantially sharp inner edge facing inwardly toward said spray pattern said tip guard being formed of material and dimensions sufficient to resist breakage during normal use.

4,685,622

PIECE GUN FOR SPRAYING

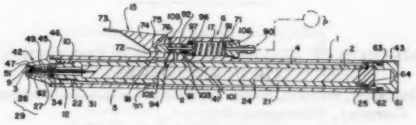
Shigeru Shimohira, Osaka; Yasuyuki Kimoto, and Kazuo Hirota, both of Okayama, all of Japan, assignors to Meiji Kikai Seisakusyo Co., Ltd., Osaka, Japan

Filed Jul. 12, 1985, Ser. No. 754,123

Claims priority, application Japan, Jul. 21, 1984, 59-110550[U]; Jul. 21, 1984, 59-110551[U]; Jul. 21, 1984, 59-110552[U]; Aug. 2, 1984, 59-163695; Aug. 28, 1984, 59-130892[U]

Int. Cl.[4] B05B *7/06*

U.S. Cl. 239—346 **5 Claims**



1. A piece gun for spraying comprising:

a base body;

a trunk part including a storage area for containing a coating liquid, said trunk part being positioned within said base body;

a head portion connected to said trunk part and provided with a writing member for discharging said coating liquid;

a first air passage surrounding at least said head portion of said trunk part;

a second air passage which may be operatively connected to a source of high pressure fluid;

a switching valve including an operational member for manual actuation and a working member operatively connected to said operational member wherein the working member initially operates the switching valve to connect the second air passage to the atmosphere during an early stage of operation of said operational member and said working member communicates the second air passage with the first air passage during a latter stage of operation.

4,685,623

METHOD AND APPARATUS FOR TREATING PULP

James d'A. Clark, 300 Hot Springs Rd., Santa Barbara, Calif. 93108

Continuation-in-part of Ser. No. 426,620, Sep. 29, 1982, abandoned. This application Apr. 29, 1985, Ser. No. 726,966

Int. Cl.[4] B02C *19/12*

U.S. Cl. 241—21 **1 Claim**

1. A method of treating pulp fibers to be made into paper, which comprises the steps of:

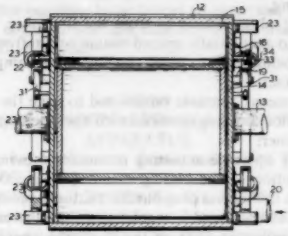
mixing the fibers with sufficient water to form a slurry,

directing a continuous stream of the slurry to a series of narrow nips defined by a drum and a plurality of revolving rolls,

pressing said rolls against the drum with a predetermined pressure,

causing the nips to grab a substantial portion of the fibers in the stream, the fibers being longer than the width of each of the nips,

permitting the remaining stream of water and uncaught



fibers to pass through circumferential grooves disposed between adjacent nips,

squeezing the fibers caught between the nips, and

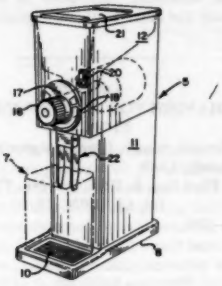
dispersing the squeezed fibers into the surrounding slurry upon leaving the nips.

4,685,624

COFFEE GRINDER WITH BAG ACTUATED SWITCH

Charles A. Nidiffer, Decatur, and Raymond E. Van Camp, Rochester, both of Ill., assignors to Bunn-O-Matic Corporation, Springfield, Ill.

Filed Mar. 20, 1986, Ser. No. 841,846
Int. Cl.[4] B02C *25/00*
U.S. Cl. 241—36 **8 Claims**



1. In a coffee grinder comprising a grinder body having a top portion and a trunk portion, a coffee bean hopper in the top portion of said body, a coffee bean grinder mechanism in the upper portion of said body, an electric motor connected in driving relationship with said grinder mechanism, electrical circuit means for energizing said electric motor from a current source and including a manual on/off/start switch and a two-condition switch which in one condition allows said electric motor to be energized by manipulating said on/off/start switch and automatically de-energizes said electric motor in its other condition, ground coffee discharge chute means projecting downwardly from an over-hanging upper portion of said body in spaced relationship with a trunk portion of said body so as to permit the mouth portion of a bag to be inserted between said chute means and said trunk portion, and bag-actuated switch operating means,

said two-condition switch being stationarily mounted in said trunk portion, and

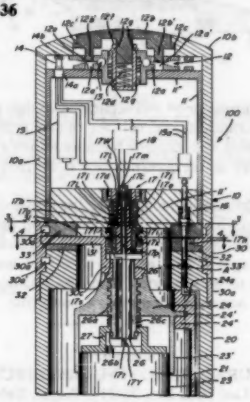
said bag-actuated switch operating means comprising an angle-shaped lever pivotally mounted on said trunk portion and having a bag-engageable leg and a switch actuating leg, said lever being so balanced that in the absence of a bag mouth inserted between said bag-engageable leg and said discharge chute means said bag-engageable leg rests under the force of gravity in a first position in which said switch actuating leg causes said two-condition switch to be in its said other condition in which said motor is de-energized, and when the mouth of a bag is inserted between said bag-engageable leg and said discharge chute means said lever is moved to a second position in which said switch actuating leg allows said two-condition switch to be in its said one condition wherein said electric motor is allowed to be energized by manipulating said on/off/-start switch.

4,685,625

GRINDING MILL

Frank Mazza, 4897 Barclay, Apt. 4, Montreal, Quebec, Canada H3W 1E1

Filed Feb. 26, 1986, Ser. No. 832,881
Claims priority, application Canada, Mar. 6, 1985, 475858
Int. Cl.[4] B02C *7/11*
U.S. Cl. 241—36 **18 Claims**



1. An electric cordless mill for grinding, for example peppercorns, comprising in combination:

a first housing comprising an inner portion and an outer portion rotatably mounted thereon, and means for selectively interlocking said inner portion and outer portion together whereby they may be rotated together, electrical switch means in said housing and operable upon relative rotary movement between said first and second portions, said first housing further containing power means controlled by said switch means;

a second housing secured to said first housing via a first connector means, said second housing containing an electric motor means connected to said power means via a second connector means, said motor means drivingly connected to milling means, operation of which is controlled by said switch means.

4,685,626

CRUSHED CARCASE SEPARATION HEAD AND MACHINE

Jean P. Kerdiles, Plogastel Saint-Germain, and Roger Marlot, Quimper, both of France, assignors to Les Innovations Mecaniques Alimentaires (S.A.R.L.), Bannalec, France

Filed Jun. 12, 1985, Ser. No. 743,943
Claims priority, application France, Jun. 14, 1984, 84 09534
Int. Cl.[4] B02C *19/22, 23/16;* A22C *17/00*
U.S. Cl. 241—74 **8 Claims**

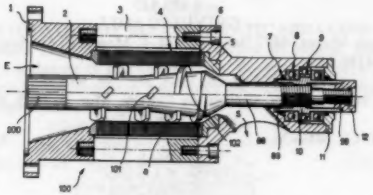
1. A mechanical separation head for treatment of carcases crushed in a carcase crusher; the mechanical separation head comprising:

a grille fixed in said mechanical separation head for separating flesh from the carcases crushed in said crusher, said

grille having meshes across which the flesh separated from the carcase is extruded;

a mashing and scraping member mounted in said separation head homogenising the crushed carcases during their transit in said separation head from an entry to an exit and scraping the internal surface of said grille for eliminating hard elements from the crushed carcases which elements tend to obstruct the meshes of said grille;

said mashing and scraping member comprising a frusto-conical piece equipped with teeth, each tooth having a tooth



surface dimensioned and separated so that each said tooth surface scrapes an internal face of said grille so that when said mashing and scraping member makes a complete turn, the totality of the internal face is scraped by said teeth; and;

means for driving under pressure the crushed carcases to be treated and for serving as a connection between the carcase crusher and said head capable of forcing the crushed carcases against said grille with a pressure sufficient for the flesh to be separated from the crushed carcases and extruded across said meshes of said grille.

4,685,627

PLURAL-SEASONING DISTRIBUTOR

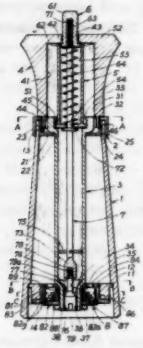
Ching-Chang Lee, P.O. Box 70-217, Taipei, Taiwan

Filed Feb. 6, 1986, Ser. No. 826,780

Claims priority, application Taiwan,

Int. Cl.[4] B02C *19/08*

U.S. Cl. 241—169.1 **12 Claims**



1. A seasoning distributor comprising:

an outer container for containing seasoning particulates and having open top and bottom ends;

an inner container for containing a seasoning powder and mounted for rotation within the outer container, the inner container extending axially within the outer container and terminating in an open bottom end;

means for mounting the inner container for rotation within the outer container;

an upper cover mounted for rotation on the outer container;

means responsive to the rotation of the upper cover to rotate the inner container within the outer container;

a rod extending through the inner container and including at its bottom end a first plug positioned above the bottom opening of the inner container and sized to block said opening;

a second plug depending from the first plug, and coupled thereto at an axially spaced distance therefrom, the second plug being sized to block the bottom opening of the inner container;

biasing means operable on the rod to urge the second plug into blocking engagement with the opening of the inner container;

manually operable actuating means for moving said rod in opposition to the biasing means from a first position in which the second plug blocks the discharge opening of the inner container, to a second position wherein the second plug moves away from the discharge opening to permit discharge of seasoning powder and the first plug moves into blocking engagement with the discharge opening to limit the powder discharged to the seasoning;

a grinding stator positioned within the discharge opening of the outer container and having radially inwardly projecting tooth surfaces;

a grinding rotor assembly mounted for rotation with the inner container and including a plurality of grinding discs of respectively different diameters adjacently superimposed one above the other,

each of said discs having a number of arcuate extensions protruding from its perimeter, said extensions having a toothed edge progressively deviating at a small angle from the corresponding edges of the other discs, the toothed edges cooperating with the tooth surface of the stator to crush the seasoning particulate as the rotor assembly rotates with the inner bottle in response to rotation of the cover.

4,685,628

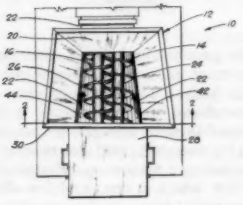
FEED MECHANISM FOR A DEBONING MACHINE OR THE LIKE

Douglas R. Berrett, Sandy, Utah, assignor to Beehive Machinery, Inc., Sandy, Utah

Filed Sep. 6, 1985, Ser. No. 773,420

Int. Cl.[4] B02C *18/00*

U.S. Cl. 241—236 **7 Claims**



1. A feed mechanism for a deboning machine comprising

a double convergent in-feed hopper for receiving pieces of material such as bony meat, fowl or fish,

the hopper having a bottom wall portion and opposite side walls converging downwardly and joining with the bottom wall portion;

the hopper having opposite end walls with an exit opening in one of the end walls adjacent the bottom wall portion;

a pair of generally parallel rotary feed screws disposed in the hopper in close proximity with the bottom wall portion for transporting the pieces in a longitudinal exit direction along the axial directions of the feed screws and out of the hopper through the exit opening;

the opposite side walls having longitudinally converging

side wall portions disposed oppostie the feed screws and converging toward each other and toward the feed screws in the exit direction whereby the side walls are doubly convergent, both downwardly and in the exit direction;

the converging side wall portions affording tapered spaces between such converging side wall portions and the feed screws for enabling large pieces to enter the spaces and become engaged with the feed screws for transportation in the exit direction.

4,685,629

MONITOR OF ABNORMALITY IN A YARN WINDING APPARATUS

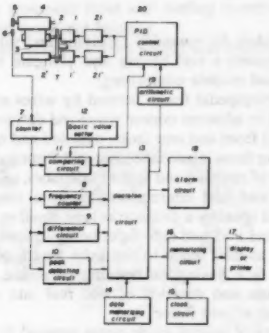
Takami Sugioka, Matsuyama, Japan, assignor to Teijin Seiki Co., Ltd., Osaka, Japan

Filed Mar. 28, 1986, Ser. No. 845,886

Claims priority, application Japan, Mar. 28, 1985, 60-64783; Mar. 28, 1985, 60-64784; Mar. 28, 1985, 60-64785; Mar. 28, 1985, 60-64786

Int. Cl.[4] B65H *54/00, 63/00, 67/048*

U.S. Cl. 242—18 R **11 Claims**



1. An apparatus for monitoring abnormality in a yarn winding apparatus, comprising means for previously setting a basic value of a winding factor, means for detecting a present value of said winding factor, means for comparing said present value of said winding factor detected by said winding factor detecting means with said basic value set by said basic value previously setting means, means for discriminating a change in a pattern of said winding factor when said detected present value of said winding factor exceeds more than a set range from said set basic value as a result of comparison in said comparing means, and means for emitting an alarm signal in accordance with the discriminated changed pattern.

4,685,630

METHOD AND DEVICE FOR SUPPLYING AN AUTOMATIC WINDING MACHINE WITH BOBBINS

Heinz Bühren, and Winfried Schumacher, both of Moenchengladbach, Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Moenchengladbach, Fed. Rep. of Germany

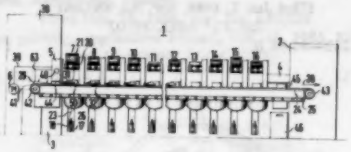
Filed Feb. 11, 1986, Ser. No. 828,302

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504883

Int. Cl.[4] B65H *54/20, 67/06*

U.S. Cl. 242—35.5 A **13 Claims**

1. Method for supplying winding units of an automatic winding machine with bobbins to be unwound from a bobbin feeding device, which comprises requesting a bobbin from the feeding device at a given winding unit, depositing a given bobbin requested by the given winding unit at a distance from other bobbins onto a conveyor belt running along the winding units, transporting the given bobbin to the given winding unit on the conveyor belt, subsequently removing the given bobbin from the conveyor belt and conducting the given bobbin to the given winding unit with a controllable bobbin removing device of the given winding unit, and preventing bobbin removing devices of winding units other than the given winding unit from diverting the given bobbin and from conducting the given bobbin to the winding units other than the given winding unit.



4,685,631

APPARATUS FOR FEEDING BONDING WIRE

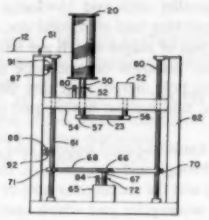
John A. Kurtz; Donald E. Cousens, both of Saco, and Mark D. Dufour, Portland, all of Me., assignors to Fairchild Semiconductor Corporation, Cupertino, Calif.

Division of Ser. No. 507,340, Jun. 24, 1983, Pat. No. 4,498,638. This application Feb. 4, 1985, Ser. No. 697,833

The portion of the term of this patent subsequent to Feb. 12, 2002, has been disclaimed.

Int. Cl.[4] B65H *49/34*

U.S. Cl. 242—47 **4 Claims**



1. An apparatus for feeding bonding lead wire from an elongate spool to the capillary wire holding tool of a lead wire bonding machine comprising:

spool mounting means constructed and arranged for mounting the spool for rotation around the spool axis;

spool motor means coupled to the spool mounting means for rotating a spool about the spool axis;

control means operatively coupled to the spool motor means for actuating said spool motor means and advancing lead wire from the spool in predetermined increments;

axial drive motor means operatively coupled to the spool mounting means for translating said spool in an axial direction to maintain the angle of feeding of lead wire from the spool within a desired angular range;

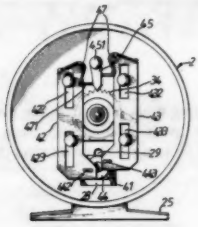
said spool mounting means comprising a rim having index means formed thereon, spool rotation sensor means operatively mounted and coupled to the spool mounting means for detecting the index means upon rotation of the spool and for generating corresponding signals, counting logic means operatively coupling said spool rotation sensor signals and the axial drive motor means for actuating said axial drive motor means each predetermined number of rotations for maintaining the wire feeding from the spool substantially at right angles to the axis of the spool.

4,685,632

CLICKER-TYPE BRAKE FOR FLY-FISHING REEL

Shih-Yuan Yeh, No. 2-4, Chen Hsing Road, Tai Ping Hsiang, Taichung Hsien, Taiwan

Filed Jul. 1, 1986, Ser. No. 881,061
Int. Cl.[4] A01K *89/02*
U.S. Cl. 242—84.51 R **1 Claim**



1. A fishing reel comprising a housing, a spool mounted rotatably in said housing, a clicker gear mounted securely and co-axially on said spool, a pawl pivotally disposed on said housing to engage with two adjacent teeth of said gear and adjustment means associated with said pawl, characterized in that said adjustment means comprises:

(A) a rectangular recess on said housing, an elongated slot further disposed within said recess with the axis thereof passing through the rotation axis of said spool, two pairs of blockades which are disposed along two sides of the recess in parallel with the axis of the elongated slot;

(B) a lock plate disposed on said recess with two flanges thereof parallel with said blockades and a central hole thereof matching said elongated slot, each of said flanges having a pair of ridges which are held by said blockades;

(C) a washer disposed on said lock plate with a central rectangular hole thereof matching the central hole of said lock plate, said washer having two opposing eccentrical pins;

(D) a drag knob disposed outside said housing with a axle running through said elongted slot, the central hole of the lock plate and the rectangular hole of the washer, the axle having a rectangular end which matches the rectangular hole of the washer, and a screw for fixing said knob, lock plate and washer together which fits into a threaded hole in the center of the rectangular end of the washer axle;

(E) two sliding plates disposed symmetrically with respect to a plane passing through the axis of the elongated slot and the rotation axis of the spool, each of the two sliding plates having a first slot perpendicular to said plane which fits on one of the washer pins, each sliding plate further having two second slots parallel with said plane, a pair of rivets passing through each of said second slots and being secured on the housing to guide the movement of said sliding plate, each plate further having three hooking means to receive a Z-shaped flat spring, said spring being associated with and in contact with said pawl to provide resistance to the movement of said pawl;

said fishing reel being further characterized in that said knob, together with said lock plate and washer, can slide back and forth along said elongated slot to extreme positions so as to change the relative position of said Z-shaped springs with respect to the pawl and thus the resistance thereof; and

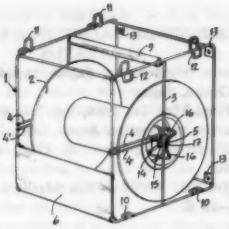
said fishing reel further having the property that said knob rotates the washer, the pins of the washer thus moving the sliding plates in opposite directions and changing the relative positions of said sliding plates with respect to said pawl, and changing the resistance therebetween.

4,685,633

UNWINDING MODULE FOR PACKING REELS CONTAINING ELECTRIC CONDUCTORS

Renzo Pellini, Sorocaba, Brazil, assignor to Pirelli S/A Companhia Industrial Brasileira, Brazil

Filed Jan. 2, 1986, Ser. No. 815,581
Claims priority, application Brazil, Jan. 4, 1985, 8500013
Int. Cl.[4] B65H *49/04;* **B65D** *85/66*
U.S. Cl. 242—85 **14 Claims**



1. A module for rotatably receiving and supporting a shaft which supports a reel having and elongate member wound thereon, said module comprising:

a parallelopipedal frame formed by wires at its corners secured to adjacent corner wires and defining opposed and spaced front and rear faces, opposed and spaced interconnecting faces interconnecting said front and rear faces and a pair of opposed and spaced side faces, said front and rear faces and said interconnecting faces respectively being spaced apart by a distance at least equal to the diameter of said reel and said side faces being spaced apart by a distance at least equal to the axial length of said reel, said front face having an opening of a size which permits insertion and removal of said reel into and out of the interior of said frame; and

two pairs of spaced guide wires secured to said frame for receiving said shaft, one pair of said guide wirs extending from a point at one side of said front face spaced from said top and bottom faces by a distance at least equal to the radius of said reel toward said rear face for a distance at least equal to the radius of said reel and the other pair of said guide wires extending from a point at the other side of said front face spaced from said top and bottom faces by a distance at least equal to the radius of said reel toward said rear face for a distance at least equal to the radius of said reel, each said pair of guide wires having a partial loop portion at a distance from said front face at least equal to the radius of said reel for receiving and restricting movement of said shaft in the direction from one said rear face and said front face toward the other thereof; whereby said shaft with said reel thereon may be inserted into the interior of said frame by inserting the ends of said shaft between said pairs of guide wires and moving said shaft toward said rear face until the ends thereof are received in said partial loop portion of each said pair of guide wires.

4,685,634

PORTABLE RETRACTABLE REEL SYSTEM

Frederic W. Schwartz, Providence, R.I., assignor to Cable Electric Products, Inc., Providence, R.I.

Continuation of Ser. No. 783,398, Oct. 3, 1985, abandoned, which is a continuation of Ser. No. 692,809, Jan. 7, 1985, abandoned, which is a continuation of Ser. No. 496,021, May 19, 1983, abandoned. This application May 5, 1986, Ser. No. 859,960
Int. Cl.[4] B65H *75/40*
U.S. Cl. 242—96 **5 Claims**

1. An electrical extension cord connector reeling mechanism, in combination, comprising:

a cylindrical housing having a rear wall and a cylindrical

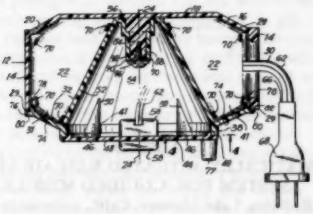
side wall forming an aperture, and a circular edge defining an open side opposing said rear wall,

a truncated conical reeling member coaxially mounted in said cylindrical housing, said reeling member having a conical side wall, with a generally upwardly extending circular flange at one end and a truncated wall at the other end, rotatably attached to said rear wall, and further having a base portion at the flanged end, said flange comprising an interface on its outer edge which is rotatably coextensive with said circular edge of said open side of said housing,

jack means mounted to said base portion for receiving at least one plug,

an electrical extension cord having a connector end connected to said jack means and an opposite end connected to a cord plug, said cord being extended through said aperture with said plug positioned outside said housing, said cord being movable to a plurality of positions between and including a first position and a second position, said first position being wherein said cord is fully wound in said housing around said conical side wall of said reeling member and said second position being wherein said cord is fully unwound from said reeling member and is fully extended from said housing,

means for passing said cord from within said housing to said jack means,



means connected to said reeling member for rotating said reeling member and winding said cord into said housing,

means for rotatably attaching said truncated wall to said rear wall, and means for connecting said cord to said reeling member.

wherein said means for rotatably attaching said truncated wall of said conical reeling member to said rear wall of said housing includes an axle member coaxially mounted with said cylindrical housing at said rear wall and extending into said housing, said axle member having a circular end wall which includes a hole coaxially with said axle for receiving a fastener,

said truncated wall is formed into a bearing member that extends into said chamber, is coaxial with said conical reeling member and said axle, and is rotatably mounted on said axle member,

said axle having a circular stop portion near the end wall,

said bearing member having a circular stop recess for rotatably mating with said circular stop portion, and having a bore open end, said circular stop recess and said bore open end are located so that the bore open end is in substantial alignment with the axle's circular end wall when the stop recess is mated with the stop portion, and

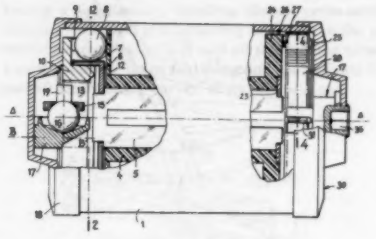
said axle circular stop portion is spaced from the end wall sufficiently so that when the stop recess is mated with the stop portion, there is no contact between the truncated wall and the housing rear wall.

4,685,635

SAFETY BELT WINDER HAVING A CYLINDRICAL BODY

Jean Monsigny, Saverne, France, assignor to Aciers et Outillage Peugeot, Audincourt, France

Filed Feb. 18, 1986, Ser. No. 830,028
Claims priority, application France, Feb. 15, 1985, 85 02231
Int. Cl.[4] B60R *22/38, 22/40*
U.S. Cl. 242—107.4 A **12 Claims**



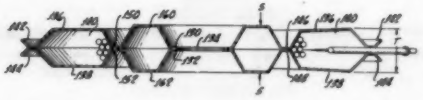
1. A safety belt winder comprising a base having a tubular shape and defining an inner surface, end side walls mounted on the base, a strap-return spring device, locking means for the strap and responsive to a sudden pulling force exerted on the strap, a strap-carrying reel rotatively mounted inside the base and journalled relative to the end side walls, and rolling elements in contact with said inner surface of the base rotatively mounting the reel in the base at at least one end of the reel, said end side walls respectively carrying said strap-return spring device and said locking means.

4,685,636

REEL AND REEL HANDLING SYSTEM

Homer L. Eaton, Leucadia, Calif., assignor to MTS Vektronics Corporation, Carlsbad, Calif.

Filed Jun. 24, 1985, Ser. No. 748,339
The portion of the term of this patent subsequent to Jan. 27, 2004, has been disclaimed.
Int. Cl.[4] B65H *49/00*
U.S. Cl. 242—129 **2 Claims**



1. A stackable wire handling reel comprising

first and second side plates, each side plate comprising:

an outwardly bent annular cavity section having a peripheral lip,

an outwardly bent inner section including a hub section located radially inwardly of said annular cavity section,

said side plates being secured to each other at points located between said cavity and inner sections, each plate having an annular intermediate section spaced inwardly of said cavity section, and each side plate having an outwardly facing circular groove, each groove having a bottom formed by an outer surface of said intermediate section and sides formed by outer surfaces of said cavity and inner sections, said cavity sections mating with each other to form a wire receiving chamber having a radially outer periphery defined by adjacent peripheral lips of said annular cavity sections, said wire receiving chamber having a length of wire wound therein, and said wire having at least one end passing between said peripheral lips and projecting from said chamber.

4,685,637

YARN TRAVERSING GUIDE

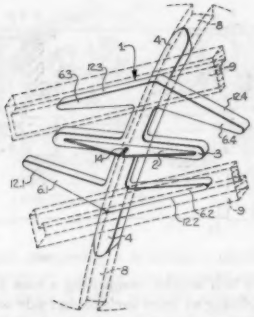
Albert Stitz, Kürten, Fed. Rep. of Germany, assignor to Barmag AG, Remscheid, Fed. Rep. of Germany

Filed Aug. 29, 1986, Ser. No. 902,305

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530804

Int. Cl.[4] B65H *54/30*

U.S. Cl. 242—157 R **12 Claims**



1. A traversing yarn guide adapted for reciprocating an advancing yarn or the like to form a wound package on a yarn winding machine, and comprising:

a body member comprising an elongate follower defining a longitudinal plane, and first and second arms mounted on one side of said follower, and with said arms extending laterally outwardly in opposite directions from said longitudinal plane and being in substantial lateral alignment, and with said arms having relatively straight outer edges which define a somewhat V-shaped outline in plan view and have an obtuse angle therebetween, said arms being composed of a relatively resilient material and such that the arms are relatively flexible, and

a yarn engaging member mounted to said body member and including a portion which extends beyond the side of said arms opposite said follower.

4,685,638

CASSETTE FOR ACCOMMODATING ELECTRICALLY CONDUCTIVE FILM

Yasuhiko Satoyoshi, and Koji Wada, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 14, 1986, Ser. No. 819,077

Claims priority, application Japan, Jan. 14, 1985, 60-3024[U]; Jan. 14, 1985, 60-3025[U]; Jan. 14, 1985, 60-3026[U]; Jan. 14, 1985, 60-3027[U]; Jan. 14, 1985, 60-3028[U]; Jan. 17, 1985, 60-5051

Int. Cl.[4] G03G *21/00;* **G11B** *23/087*

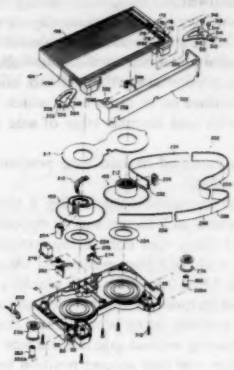
U.S. Cl. 242—199 **42 Claims**

1. A cassette for accommodating a film which has an electrically conductive layer, comprising:

(a) a reel body having a recess formed in the outer peripheral portion of its hub;

(b) a contact piece for grounding which is disposed on said reel body such that a portion of said contact piece is positioned in said recess; and

(c) a clamp fitted into said recess so as to retain one end of said film between the same and said recess and press said film against said contact piece, whereby the end portion of



said film wound on said reel body is grounded through said contact piece.

4,685,639

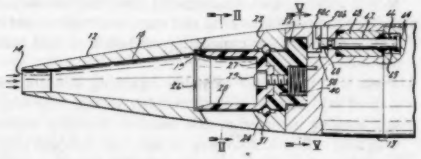
PNEUMATICALLY ACTUATED RAM AIR STEERING SYSTEM FOR A GUIDED MISSILE

William R. Bains, Lake Elsinore, Calif., assignor to Ford Aerospace & Communications Corp., Dearborn, Mich.

Filed Dec. 23, 1985, Ser. No. 812,208

Int. Cl.[4] F42B *15/033*

U.S. Cl. 244—3.22 **9 Claims**



1. A system for directionally controlling a fired projectile spinning at a predetermined rate in a predetermined direction when traveling over its flight path comprising:

means at the nose end of said projectile for defining a cylindrical chamber having one end opened for receiving ram air;

a pair of oppositely disposed air passages extending from the chamber means to opposite sides of said projectile;

means between said chamber means and said passages for blocking ram air flow to both of said passages and for responsively diverting said ram air in a predetermined direction through one of said passages; and

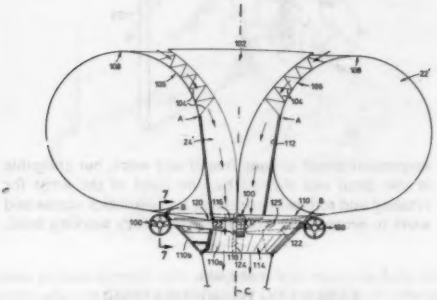
means for rotating said blocking and diverting means in a first direction to divert said ram air through a first one of said passages or in a second direction to divert said ram air through a second one of said passages to effect corresponding steering force thrust vectors.

4,685,640

AIR VEHICLE

John E. Warrington, Toronto, and Dale C. Kramer, Port Colborne, both of Canada, assignors to Hystar Aerospace Development Corporation, Vancouver, Canada

Filed Aug. 29, 1985, Ser. No. 770,490
Claims priority, application Canada, May 6, 1985, 480837
Int. Cl.[4] B64B *1/34*
U.S. Cl. 244—29 **11 Claims**



1. An air vehicle comprising:

an envelope having the general shape of a torus extending about a passageway between top and bottom surfaces of the envelope, the envelope containing a gas which is lighter than air, said passageway being of inverted generally frusto-conical shape flaring outwardly adjacent its upper end and merging smoothly into said top surface of the torus, said passageway tapering inwardly toward said bottom surface of the torus to a discharge opening in said surface on a vertical center line of the vehicle;

fan means carried by the envelope and arranged to direct air downwardly through the passageway to generate a downwardly vectored thrust for lifting the vehicle, the fan means being controllable to vary the magnitude of the thrust and hence the altitude of the vehicle in flight;

propulsion means carried by the envelope and adapted for generally lateral propulsion of the vehicle; and,

a gondola suspended from said envelope at the lower end of said passageway and supporting said fan means for drawing air downwardly through the passageway and generating said thrust, the gondola defining a central opening which is on said center line of the vehicle and coincident with said discharge opening, and through which air is directed downwardly from the passageway.

4,685,641

TRANSIENT AIR AND SURFACE CONTACT VEHICLE

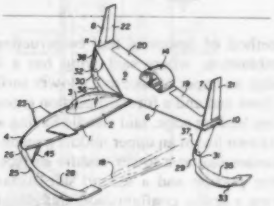
Jerome Kirsch, Dix Hills; M. Alan Kopsco, Wantagh; Edward Markow, Oakdale, and Michael Sturm, N. Massapequa, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation-in-part of Ser. No. 505,808, Jun. 20, 1983, abandoned. This application Aug. 26, 1985, Ser. No. 769,241
Int. Cl.[4] B64C *25/54, 35/00*
U.S. Cl. 244—105 **6 Claims**

4. A transient air and surface contact vehicle for transporting a person, said vehicle comprising

a fuselage structure for carrying a person, said structure having a nose and a spaced opposite tail end, a wing mounted thereon at said tail end and fin means extending substantially perpendicular from the surface of said wing, said fin means comprising a pair of fins each at a corresponding tip of said wing

buoyant vehicle support means extending from said structure and abutting a surface and thereby supporting said vehicle at a predetermined distance above the surface of a body of water, ground, and the like, when said vehicle is in motion, said vehicle support means including a forward strut pivotally mounted at one end at the nose of said structure and having a buoyant forward pontoon-like device at its spaced opposite end constantly abutting said surface and a pair of aft struts pivotally mounted at one end at the opposite tips of said wing and having buoyant aft pontoon-like devices at their spaced opposite ends abutting said surface, each of said struts comprising a substantially rigid tube curved at its opposite end and having a substantially teardrop shaped cross-section for reducing drag and strengthening said strut in the primary bending direction, each of said aft struts being mounted at a corresponding tip of said wing and each of said forward and aft struts being curved at its opposite end;



power means mounted on said structure for moving said vehicle along said surface at said predetermined distance above said surface; and

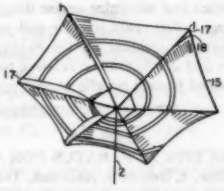
position control means mounted on said structure for providing pitch plane stability by trimming said vehicle as an aircraft for a pitch down moment during flight across a surface, said position control means selectively producing a negative pitching moment to maintain said vehicle in surface-following contact with said surface and a positive pitching moment to cause said vehicle to become airborne, both moments controlling the altitude of said vehicle when it is airborne, said position control means including wing flaperons and fin rudder means for directional and roll control during air and surface movement.

4,685,642

ROTARY KITE

Alden Schloss, 4510 San Taela Ct., Woodland Hills, Calif. 91364

Continuation of Ser. No. 565,759, Dec. 27, 1983, abandoned. This application Oct. 10, 1986, Ser. No. 917,492
Int. Cl.[4] B64C *31/06*
U.S. Cl. 244—153 A **4 Claims**



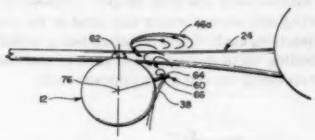
1. A rotary kite which is free to rotate while tethered by flexible means, said kite having a minimum of structural members consisting of a hub, a plurality of masts radiating from said hub, a plurality of sails attached to said plurality of masts, each of said plurality of sails being sheeted to an adjacent one of said plurality of masts with slack to allow wind spillage, and a shaft extending through said hub to allow attachment of said flexible means to constrain said kite.

4,685,643

NACELLE/WING ASSEMBLY WITH VORTEX CONTROL DEVICE

Michael L. Henderson, Seattle, and Ralph B. Owen, Issaquah, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Aug. 4, 1983, Ser. No. 521,039
Int. Cl.[4] B64C *23/06*
U.S. Cl. 244—199 **5 Claims**



1. A method of designing and constructing a nacelle and wing combination, where said wing has a leading edge, a trailing edge, an upper surface and a lower surface, said nacelle having a front end and a forward portion extending forwardly of said wing leading edge, said nacelle having an outer surface, an upper crown line at an upper middle nacelle surface portion, a lower center line at a lower middle surface portion, a first side surface portion and a second side surface portion, said wing having a cruise configuration and a high lift configuration where in a high lift/high angle of attach mode of operation, there are first and second upwash fields at the first and second side surface portions of a nacelle forwardly of the wing leading edge, said first upwash field having a lower inflow portion where flow enters said upwash field, and an upper outflow portion where flow leaves said upwash field, and there is created from the flow from the first upwash field a critical vortex which is formed at a vortex forming location and which is shed from the first side surface portion to travel over the wing leading edge, said method comprising:

a. determining existence of premature vortex bursting, which is a condition where said vortex is bursting above a forward portion of the upper surface of the wing rearwardly of the leading edge of the wing, with said wing and nacelle in the high lift/high angle of attack mode of operation:

b. under circumstances where said premature vortex bursting is occurring, applying a vortex control device to said first side surface portion of said nacelle at a location upstream of said vortex forming location in said first upwash field in a path of airflow which forms said vortex;

c. determining an optimized location of said vortex control device to minimize vortex burst;

d. optimizing dimensions and configurations of said vortex control device to produce said vortex at sufficient strength to give the wing desired predetermined operating characteristics and minimize cruise drag; and

e. constructing a full scale nacelle and wing combination with said vortex control device having said optimized dimensions and configuration relative to said nacelle and being mounted to said nacelle at said optimized location.

4,685,644

PROTECTIVE APPARATUS FOR ARTISTS

Roy E. Yates, Rte. 1, Box 80B, Angleton, Tex. 77515

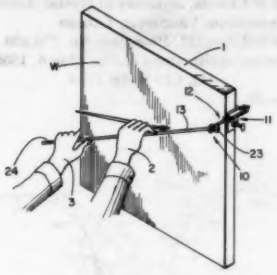
Filed Jun. 19, 1986, Ser. No. 875,952
Int. Cl.[4] B43L *15/00*
U.S. Cl. 248—118.3 **5 Claims**

1. Apparatus for protecting the work of an artist as work is being performed on canvas or other work surface mounted on a canvas frame or other support, said apparatus comprising:

mounting means for attaching said apparatus to said frame of support;

suspension means extending outwardly from said mounting means and including a rod member which is rotatable about an axis substantially perpendicular to the plane of said canvas or work surface; and

a maulstick supportable from a proximal end thereof by said



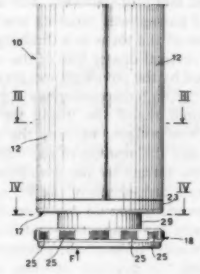
suspension means to hang free of said work, but graspable at the distal end thereof by one hand of the artist for rotating said rod and positioning said maulstick across said work to protect said work from the artist's working hand.

4,685,645

TABLE LEG WITH SHEATING

Carlo Cattaneo, Figino Serenza, Italy, assignor to Camar S.p.A., Como, Italy

Filed Apr. 4, 1985, Ser. No. 719,824
Claims priority, application Italy, Apr. 6, 1984, 21464/84[U]
Int. Cl.[4] A47B *13/02*
U.S. Cl. 248—188.8 **3 Claims**



1. A table leg comprising a cylindrical load bearing central core, a plurality of longitudinal sheathing staves surrounding the outer surface of said core and connecting means for securing the staves to the core, said connecting means comprising a plurality of peripherally spaced, T-shaped segments integral with the core and projecting radially outward therefrom and complimentary shaped longitudinal edges on said staves for sliding insertion of the staves between said segments, the longitudinal edges of said staves being shaped so that the opposed abutting edges of two adjacent staves form a longitudinal T-shaped seat corresponding to the T-shape of said radially extending segments of said central core with one longitudinal edge of each stave having a limb that completely overlies the outer top of the T-shaped segments.

4,685,646

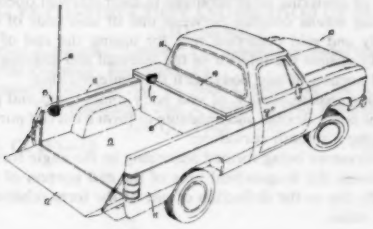
MOUNT FOR PICKUP TRUCKS

Craig Harrison, 588 James Rd., Lawrenceville, Ga. 30245

Filed Jul. 28, 1986, Ser. No. 889,622
Int. Cl.[4] A47B *96/06*
U.S. Cl. 248—225.31 **6 Claims**

1. A mount for use in mounting an object to a pickup truck bed side of the type that has an upper edge web from which a

flange downwardly extends beside a side wall, and with the mount comprising an outboard piece adapted to be mounted to the outboard side of the flange beneath the web with an upper portion of the piece located between the side wall and flange and with a lower portion located below the flange and formed with a bolt receiving hole, and an inboard piece adapted to be mounted to the inboard side of the flange and to a lower portion of the outboard piece, said inboard piece having an upper portion adapted to be mounted to an inboard side of the flange and provided with means for securing an object thereto and a



lower portion formed with an inboard bolt receiving hole, bolt means adapted to be passed through said inboard and outboard bolt receiving holes in securing the inboard and outboard pieces together clamped to the flange, and wherein said outboard piece lower portion is formed with an elongated convex protuberance beneath said outboard bolt receiving hole and wherein said inboard piece lower portion is formed with an elongated concave recess below said inboard bolt receiving hole configured to receive said outboard piece convex protuberance in pressure distribution engagement.

4,685,647

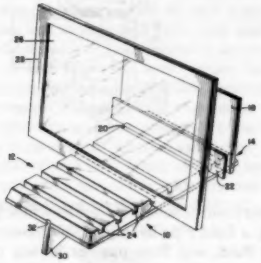
MAGNIFYING READING STAND

Myrtle M. Calhoun, 9821 82nd Ave. E., Puyallup, Wash. 98373

Filed Jun. 20, 1986, Ser. No. 876,445

Int. Cl.[4] A47B *97/04*

U.S. Cl. 248—444.1 **15 Claims**



1. A magnifying reading stand assembly comprising: base means for supporting reading matter in a generally upright, stable attitude; and transparent panel magnifying means arranged for placement in front of the reading matter a predetermined distance therefrom, there being means on said base means for supporting said transparent panel generally parallel with the reading matter, thus to facilitate viewing of the reading matter a considerable distance from said reading stand assembly; said base means including an upper surface having a front portion and a rear portion, the rear portion being arranged to support reading matter, said base means further comprising a plurality of transverse groove means formed within and across said base means front portion, generally parallel one another, for selective reception of said transparent panel magnifying means and for selective, variable magnification of the reading matter to suit the user, the degree of magnification being increased, the farther the transparent panel magnifying means is separated from the reading matter.

4,685,648

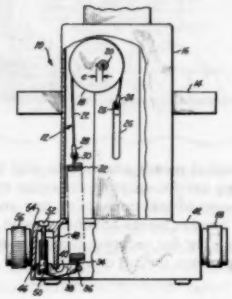
COUNTERBALANCING APPARATUS FOR USE IN AN OPTICAL INSTRUMENT

Michael H. Dobner, Webster, and Evan A. Edwards, Pittsford, both of N.Y., assignors to Bausch & Lomb Incorporated, Rochester, N.Y.

Filed May 17, 1985, Ser. No. 735,414

Int. Cl.[4] F16M *13/00*; **G02B** *21/32*

U.S. Cl. 248—572 **3 Claims**



1. Apparatus for counterbalancing the weight of a first member which is movable with respect to a second member, comprising:

eccentric means rotatably mounted to said second member;

resilient means coupled between said first and second members and engaging at least a portion of the periphery of said eccentric means therebetween, said resilient means assisting in counterbalancing the weight of said first member whereby rotation of said eccentric means causes said resilient means to deform an amount at least approximately proportional to the degree of rotation of said eccentric means, the combination of the deformation of said resilient means and the eccentricity of said eccentric member providing a counterbalancing force approximately equal to the mass of said first member; and

means for adjusting the tension of said resilient means, including a rocker arm pivotally mounted relative to said second member, said rocker arm being connected at one end thereof to said resilient means and at the other end thereof to a clevis adjustably fixed to said second member.

4,685,649

VIBRATION ISOLATOR CAMERA MOUNT

Scot A. McKay, Canoga Park, Calif., assignor to Gregory Gault, Panorama City, Calif.

Continuation-in-part of Ser. No. 632,551, Jul. 19, 1984, abandoned. This application Aug. 20, 1985, Ser. No. 768,911

Int. Cl.[4] F16M *13/00, 13/04*

U.S. Cl. 248—594 **10 Claims**

1. A vibration isolator camera mount apparatus comprising:

mounting means for mounting a vibration isolator camera mount;

a generally vertically oriented connecting bar pivotally attached at the lower end to said mounting means;

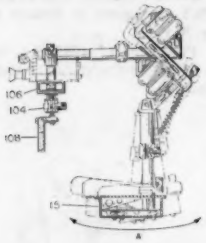
a generally horizontal boom having one end positioned near the upper end of said connecting bar, and having means for holding a camera tray at the other end of said boom;

first rubberlike inflatable air spring means and second rubberlike inflatable air spring means for interconnecting said connecting bar with said one end of said boom and for

isolating vibrations transmitted from said mounting means to said boom and said camera tray;

first base plate means attached at one end of said boom for securing one end of said first air spring means;

second base plate means attached to said boom inwardly from said first base plate means for securing one end of said second air spring means.



first bar bracket means attached to said upper end of said connecting bar for securing the other end of said first air spring means to said connecting bar; and

second bar bracket means attached to said lower end of said connecting bar for securing the other end of said second air spring means to said connecting bar.

4,685,650

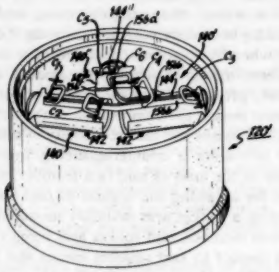
APPARATUS FOR FORMING INVERTS AND MANHOLE ASSEMBLIES

Jack Ditcher, Tullytown, Pa., assignor to A-Lok Products Corporation, Tullytown, Pa.

Filed Mar. 26, 1985, Ser. No. 716,353

Int. Cl.[4] B28B *7/30*

U.S. Cl. 249—83 **50 Claims**



1. Apparatus for forming a channel in a hollow substantially cylindrical shaped cast member having a closed base portion and open upper end and having openings in the cylindrical portion of said cast member, comprising:

locating rings each arranged to be positioned within an opening;

elongated invert forming members movable relative to one another and each having a channel forming surface, means for securing each locating ring and an associated forming member to said cast member to align the channel forming surface with the opening in said cast member, said invert forming members forming an angle determined by the locations of the openings in the cast member; each forming member having an upper surface provided with an elongated projection substantially parallel to the longitudinal axis of the forming member; clamping means for aligning the forming members to maintain the longitudinal axes of the forming members in a common imaginary plane.

14. An invert forming assembly for forming an invert in the interior of a cylindrical manhole base having a pair of openings in the cylindrical sidewall extending upwardly from the floor of the manhole base, said assembly comprising:

an elongated body having a substantially D-shaped cross-section, and further having a pair of elongated rigid end portions each defining an end of the body and an intermediate portion therebetween;

the ends of said body having surfaces conforming to the curved interior of the cylindrical sidewall of the manhole base;

openings being provided in each of said ends of said elongated body;

a pair of centering rings arranged in each sidewall opening;

securing means coupled between one of said ends of said body and said centering ring for urging the end of the body against the interior of the sidewall and aligning the end portion of said body with the centering ring;

the intermediate portion of said body joining said end portions being flexible and bendable to form a curved portion having a smooth curvature;

said curvature being formed according to the angle formed between the longitudinal axes of the end portion of said body due to the deflection of one of the form relative to the other.

4,685,651

THERMOSTATIC CONTROL DEVICES

Robert Nouvelle, Claix, and Jean L. Segura, Voiron, both of France, assignors to Dauphinoise Thomson, Grenoble, France

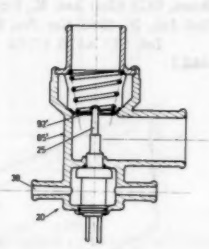
PCT No. PCT/FR84/00227, § 371 Date Jun. 7, 1985, § 102(e) Date Jun. 7, 1985, PCT Pub. No. WO85/01810, PCT Pub. Date Apr. 25, 1985

PCT Filed Oct. 10, 1984, Ser. No. 744,459

Claims priority, application France, Oct. 11, 1983, 83 16159

Int. Cl.[4] F16K *31/04;* **G05D** *23/19;* **F03G** *7/06*

U.S. Cl. 251—11 **12 Claims**



1. Thermic control device carried by a fluid pipe, said device comprising, a fluid pipe having a flow passage for carrying a circulating fluid, said flow passage having two ends which respectively provide an inlet and an outlet for a circulating fluid which flows through said pipe, said pipe having a sidewall which has a pair of opposed openings formed therein, a hollow capsule forming a chamber which is located between and spaced from the two ends of the pipe, said capsule having a front end provided with a first end wall and a rear end provided with a second end wall, a piston passing through the first end wall of the capsule, said chamber being filled with an expansible substance whose volume varies with the temperature in such a manner as to convert the variation of volume of the expansible substance into an axial displacement of the piston, a thermal means comprising at least one electrical resistor extending in said capsule and in thermal contact with said substance in such a manner as to vary its temperature for the purpose of axially displacing the piston or controlling its displacement relative to said capsule; electrical connecting means extending from said resistor through the second end

wall of said capsule, the front and the rear ends of said capsule being sealingly affixed in said opposed openings in the wall of the fluid pipe, said end walls of the capsule facing away from the pipe, said electrical connecting means extending from said capsule to a position which is outside said pipe, said piston projecting from the first end wall of said capsule outside said pipe, said capsule having a section which is located between its front and rear ends and is in thermal contact with the fluid which is circulating in said pipe.

4,685,652

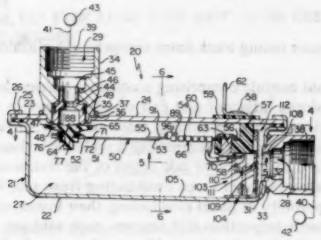
VALVE CONSTRUCTION AND METHOD OF MAKING THE SAME

Harvey J. Shopsky, Latrobe, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Division of Ser. No. 794,742, Nov. 4, 1985, Pat. No. 4,651,968. This application Jun. 4, 1986, Ser. No. 870,363

Int. Cl.[4] F16K *31/70*

U.S. Cl. 251—11 **16 Claims**



1. In a valve construction comprising a housing means provided with a chamber therein and with an inlet leading to said chamber and an outlet leading from said chamber, a valve seat carried by said housing means and leading to said outlet, a movable bimetallic lever means carried by said housing means and having an operating bimetallic part, a heater wire means disposed in coiled relation on said operating part to heat the same when an electrical current flows through said heater wire means, and a valve member carried by said bimetallic lever means for opening and closing said valve seat under the control of said operating part of said bimetallic lever means said operating part of said bimetallic lever means having a tab extending therefrom and being operatively interconnected to said heater wire means to tend to hold said heater wire means in said coiled relation on said operating part of said bimetallic lever means, the improvement wherein said heater wire means comprises a length of said wire means doubled upon itself to define a looped end and a pair of free ends adjacent each other with said looped end being hooked over said tab.

4,685,653

VALVE ASSEMBLY

Wolfgang Kaltenthaler, Wennigsen; Manfred Kramer, Barsinghausen, and Heinz-Dieter Gelse, Wunstorf, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Nov. 26, 1985, Ser. No. 801,888

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1984, 3446096

Int. Cl.[4] F16K *31/122*

U.S. Cl. 251—63.6 **10 Claims**

1. A valve assembly comprising:

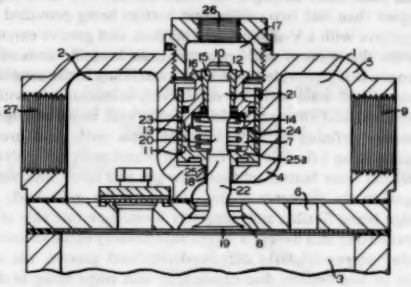
(a) a valve seat, and a valve tappet that moves relative to the valve seat;

(b) a valve tappet including an elongated shaft and a tappet head, whereby the tappet head cooperates with the valve seat to form a valve;

(c) a metal flexible stop member for limiting the amount of movement of the valve tappet in the opening direction of the valve;

(d) the shaft of the valve tappet including a reduced cross-section portion for exhibiting elastic flexibility property; and

(e) the reduced cross-section portion is located intermediate the ends of the shaft and is disposed in the vicinity of the



stop member which has an outer stop surface spaced a given distance from the central axis of the valve tappet, an inner support surface spaced a different distance than the given distance from the central axis of the valve tappet, and a deflectable undercut area located between the outer stop surface and the inner support surface, so that the excessive forces exerted on the valve tappet are absorbed by a flexible action to prevent damage to the valve tappet.

4,685,654

FLOW REGULATOR FOR DRIP INFUSION

Liang-Tung Hu, 3F., No. 248, Sec. 4, Sinyi Rd., Taipei, Taiwan

Filed Jan. 8, 1987, Ser. No. 1,816

Int. Cl.[4] F16K *7/16*; F15C *3/04*

U.S. Cl. 251—205 **4 Claims**

1. A flow regulator for drip infusion comprising a flow path with both ends respectively connected to an upstream hose coming from a dripping infusion set and to a downstream hose leading to an injecting needle, and flow regulating means which varies the effective flowing section of said flow path to control the flow rate of the liquid flowing through the regulator by actuating means for acting on pressing means to press a ridge against said flow path, said ridge extending perpendicular to said flow path, said actuating means producing a pressing action by a hollow threaded knob with an open end and a closed end, in which there is provided a plunger which has a pointed end contacting with the inner side of the closed end of said knob and a flat end pointing towards said flow path, said plunger being perpendicular to said flow path and said ridge, said flow regulating means being such that the rotation of said knob can produce a torsionless axial thrust from said plunger toward said flow path, said flow regulator being characterized

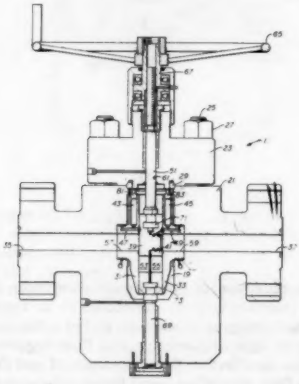
by a rigid main body in form of a hollow cylinder with an open upper end and a closed lower end with two diametrically opposite projections near the lower end thereof, each of said projections being internally provided with a canal and being open at the distal ends thereof to respectively connect with an upstream hose and a downstream hose, the lower closed end of said main body having a flat inner bottom at a level slightly higher than said two canals, said bottom being provided with a groove with a V-shaped cross section, said groove extending in the direction of said projections, each of the ends of said groove being provided with a hole extending in the axial direction of said main body to respectively communicate with the proximal end of each of said canals and being contiguous, thereby defining an omega-shaped flow path, said pressing means being a flexible disc received in said main body between said flat inner bottom and said plunger and being substantially equal to the diameter of the interior of the main body, said ridge being flexible and integrally formed on one side of said flexible disc and having a length substantially equal thereto and being perpendicularly deformed into said groove, the other side of said flexible disc opposite to said ridge being in direct contact with the flat end of said plunger to allow said actuating means to deform said ridge within said groove to regulate the flow rate through said flow path.

4,685,655

PRESSURE-BALANCED GATE FOR SPLIT-GATE VALVE

David P. Herd, Houston, Tex., assignor to Smith International, Inc., Newport Beach, Calif.

Filed Jan. 30, 1986, Ser. No. 824,188
Int. Cl.[4] F16K *3/18*
U.S. Cl. 251—282 **17 Claims**



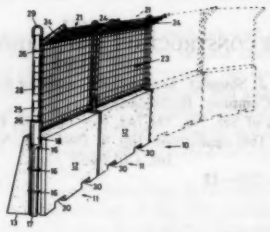
1. A gate for regulating fluid flow through a valve chamber intersecting a flowway, said gate comprising a plurality of gate members, one of said gate members having a sealing surface exposed to first flowway pressure in a first portion of the flowway and having a chamber surface pressure-isolated from the flowway and acted upon by pressure in the valve chamber in opposition to the first flowway pressure, the area of said sealing surface being greater than the area of said chamber surface, when said gate is in a closed position sealing the flowway.

4,685,656

MOTOR RACING TRACK FENCE

Kevin J. Lee, Adelaide, and Noel C. Carty, Panorama, both of Australia, assignors to Pak-Poy & Kneebone Pty Ltd., Adelaide and Humes Limited, Melbourne, both of, Australia

Filed Jul. 7, 1986, Ser. No. 882,465
Int. Cl.[4] A01K *3/00*
U.S. Cl. 256—13.1 **6 Claims**



1. A motor racing track fence comprising a plurality of fence modules

each said module comprising a concrete barrier, an upstanding sleeve adjacent one end of said barrier, a weldmesh panel assembly upstanding from an upper surface of said barrier, said panel comprising a weldmesh sheet and bars secured to respective side edges of the weldmesh sheet, a plurality of panel loops outstanding from said bars,

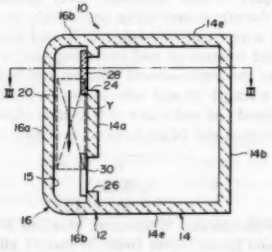
and a plurality of panel pins having their lower ends engaging with respective said sleeves, each said pin extending through aligned said panel loops of a pair of adjacent said weldmesh panels thereby joining those said mesh panels end-to-end.

4,685,657

MELTING FURNACE

Kunio Okubo, Ise, and Takashi Yamashita, Mie, both of Japan, assignors to Shinko Electric Co. Ltd., Tokyo, Japan

Filed Sep. 12, 1985, Ser. No. 775,155
Claims priority, application Japan, Sep. 18, 1984, 59-195572
Int. Cl.[4] C22B *9/16*
U.S. Cl. 266—234 **3 Claims**



1. A melting furnace comprising:

(a) a body of a refractory material having a minor portion of the furnace forming a hollow minor melting portion for holding a molten material, and a major portion of the furnace forming a hollow major heating portion disposed adjacent thereto for holding most of the molten material and adding heat thereto and maintaining the molten material at elevated temperatures said major portion being larger then said minor portions, said minor melting portion having at its upper portion an opening through which material to be melted is fed into said minor melting portion, said body having a pair of generally horizontally-spaced inlet and outlet ports each communicating said

minor melting portion with said major heating portion; and

(b) electromagnetic agitator disposed below said minor melting portion for producing a shifting magnetic field in said minor melting portion which magnetic field shifts from said inlet port to said outlet port to thereby cause the molten material to move from said minor melting portion to said major heating portion via said outlet port and then to move from said major heating portion to said minor melting portion via said inlet port.

4,685,658

SPRING ELEMENT

Jack B. Keown, CH-5400, Baden, Switzerland

PCT No. PCT/CH82/00112, § 371 Date Jun. 17, 1983, § 102(e) Date Jun. 17, 1983, PCT Pub. No. WO83/01495, PCT Pub. Date Apr. 28, 1983

Continuation of Ser. No. 518,792, Jun. 17, 1983, abandoned.

This PCT application Oct. 15, 1982, Ser. No. 796,490

Claims priority, application Switzerland, Oct. 19, 1981, 6671/81

Int. Cl.⁴ F16F *15/00, 1/18;* A47C *23/00;* E02B *3/22*

U.S. Cl. 267—80 **19 Claims**

1. A modular spring structure for receiving at least one force acting in a certain direction and at least one counterforce acting in an opposite direction,

comprising,

a single tier of latticed element, said latticed elements comprising,

a first pair of elongate bars,

a second pair of elongate bars, said second pair of elongate bars being connected at a first set of connecting locations to said first pair of elongate bars to form a closed modular structure,

an elongate linking bar, said elongate linking bar being connected to said second pair of elongate bars at a second set of connecting locations, said second set of connecting locations being located remote from and between said first set of connecting locations, and

support means in contact with and applying said counterforce to a localized region of said elongate linking bar, said force acting on one of said pairs of elongate bars,

wherein

said force produces a torque in a first direction at said first set of connecting locations, and said counterforce produces a torque in a direction opposite to said first direction at the second set of connecting locations,

each of said second pair of elongate bars is resilient in and subjected to torsion and flexion upon application of said force and counterforce to said modular spring structure, said flexion occurring in the plane of said second pair of elongate bars and also in the plane perpendicular thereto, and

each of said elongate bars in contact with said support means is resilient in and subjected to flexion.

18. A modular spring structure for receiving at least one force acting in a certain direction and at least one counterforce acting in an opposite direction,

comprising

a circular bar, said force being applied to said circular bar at a first set of locations,

an elongate linking bar, said elongate linking bar being connected to said circular bar at a second set of diametrically opposed locations, said second set of locations being located remote from said first set of locations,

and support means in contact with and applying said counterforce to a localized region of said elongate linking bar, said circular bar being resilient in and subject to torsion and flexion upon application of said force and counterforce.

4,685,659

SPRING UNIT

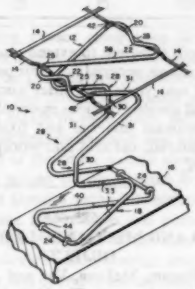
Robert C. Hagemeister, Boston, Mass., assignor to Webster Spring Co. Inc., Oxford, Mass.

Filed Jul. 29, 1985, Ser. No. 759,876

The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.

Int. Cl.⁴ A47C *23/02*

U.S. Cl. 267—103 **3 Claims**



1. A bent wire spring unit for disposition between a base frame and a grid frame comprising vertically-spaced, parallel top and bottom attaching elements and vertically-disposed, spaced, parallel supports connecting the top and bottom attaching elements such as to permit the top and bottom attaching elements to move relative to each other in response to pressure applied perpendicularly to the top attaching elements, said supports comprising vertical lengths of wire of lesser length than the distance between attaching elements and vertically-spaced upper and lower V-shaped lengths of wire defining downwardly-inclined lower legs and upwardly-inclined upper legs, said upper legs of the lower V-shaped lengths of wire being connected to the lower ends of the vertical lengths of wire and said lower legs of the upper V-shaped lengths of wire being connected to the upper ends of the vertical lengths of wire, said vertical lengths of wire and said inclined lengths of wire comprising the supports being disposed in perpendicular spaced, parallel planes with the vertical length of wire disposed in spaced, parallel relation to each other, both transversely and longitudinally and with the legs of the V-shaped lengths of wire extending from said vertical lengths of wire in opposite directions.

4,685,660

WORKHOLDER FOR SECURING A WORKPIECE THERETO

James R. Dillner, Hebron, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Filed Feb. 13, 1986, Ser. No. 829,050

Int. Cl.⁴ B25B *1/00*

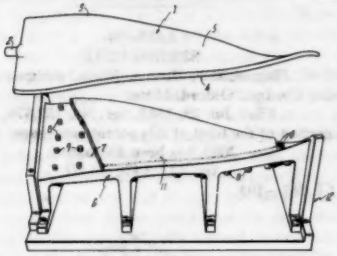
U.S. Cl. 269—7 **1 Claim**

1. A workholder wherein a curable resinous material is interposed between said workholder and a workpiece, and cured, thereby fixing said workholder to said workpiece, said workholder comprising:

(a) a body having a contoured bonding surface essentially matching a surface of said workpiece; and

(b) means disposed about said body for releasably engaging

said curable resinous material, said workpiece being releasable from said workholder by disengagement of said means from said resinous material, said releasable engagement means comprising a plurality of studs disposed within a plurality of tapped holes located about the contoured bonding surface of said body, said studs having a



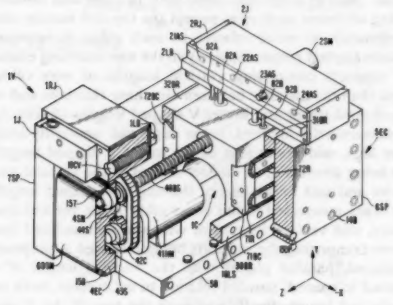
thread length sufficient to extend into said resinous material, said resinous material flowable into voids between the threads of said studs and, after curing, forming tapped holes in said curable resinous material, said threads engaging said resinous material and fixably positioning said resinous material, and thus said workpiece, relative to said workholder.

4,685,661

METHOD AND MECHANISM FOR FIXTURING OBJECTS

Alexander H. Slocum, McLean, Va., and James P. Peris, Germantown, Md., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed Jun. 21, 1985, Ser. No. 747,486
Int. Cl.[4] B23Q *3/00*
U.S. Cl. 269—20 **47 Claims**



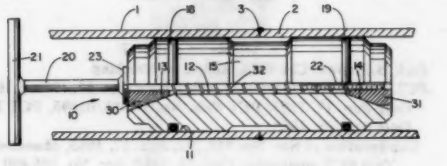
1. A vise for positioning workpieces relative to a first axis, a second axis, and a third axis which are mutually perpendicular, comprising a first jaw, a second jaw, means supporting said jaws for relative movement along said first axis in a plane extending in the directions of said first axis and said second axis such that said jaws may perform a clamping action and a releasing action, positioning means disposed between said jaws and including first and second levelling bar means which extend, respectively, across a workpiece-contacting surface of said first jaw and a workpiece-contacting surface of said second jaw substantially in the direction of said second axis for engaging a workpiece inserted between said jaws to establish the position of the workpiece along said third axis, and actuating means adjustably supporting said positioning means for moving said positioning means along said third axis to adjust said position, said actuating means including first hydraulic servo-actuator means which displaces said first levelling bar means along said third axis and second hydraulic servo-actuator means which displaces said second levelling bar means along said third axis.

4,685,662

PIPE ALIGNMENT APPARATUS

Millard A. Vaughn, 1713 S. Park Side Dr., Deer Park, Tex. 77536

Filed Feb. 28, 1986, Ser. No. 834,571
Int. Cl.[4] B25B *1/20*
U.S. Cl. 269—43 **9 Claims**



1. Apparatus for aligning the ends of two sections of pipe and or fittings to be joined together, said apparatus comprising:

a first tubular mandrel having a central bore therethrough, the opposite ends of said bore terminating in outwardly diverging first and second frusto-conical surfaces, said first mandrel being divided into a plurality of longitudinal sections, allowing said mandrel to be radially expanded;

a rod member extending through said central mandrel bore and at least one end of which may extend through one of said pipe sections for manipulation thereof;

first and second axially spaced frusto-conical members carried on said rod, said first and second frusto-conical members being axially movable toward each other upon said manipulation of said rod member wedgedly engaging said first and second frusto-conical surfaces, respectively, to effect radial expansion of said first mandrel for firmly engaging the interior of said first and second pipe sections and causing the axial alignment thereof; and

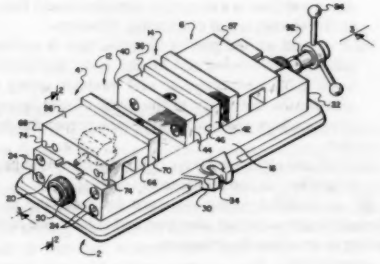
a second tubular mandrel which may be carried around and first tubular mandrel for accommodating the joining of sections of larger diameter pipe, said second tubular mandrel divided into a plurality of longitudinal sections allowing said second tubular mandrel to be radially expanded by radial expansion of said first tubular mandrel.

4,685,663

PRECISION VISE WITH INDEPENDENTLY MOVEABLE JAWS

Peter B. Jorgensen, 61 Marty Ct., Newbury Park, Calif. 91320

Filed Mar. 20, 1986, Ser. No. 841,863
Int. Cl.[4] B25B *1/10*
U.S. Cl. 269—244 **5 Claims**



1. A dual vise for holding one or more work pieces, each work piece being precisely located with respect to a fixed reference location, comprising:

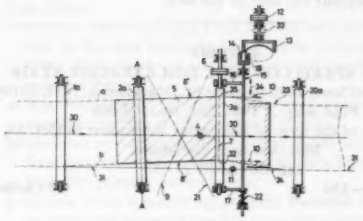
a base;
first and second stationary jaws mounted on the base;
first and second moveable jaws mounted on the base;
first and second concentric shafts adapted to rotate independent of each other and extending through the base;
the moveable jaws being capable of moving independent of each other in response to rotation of their corresponding shafts, the first shaft engaging the first moveable jaw and moving said jaw relative to the first stationary jaw when the first shaft is rotated, and the second shaft engaging the second jaw and moving said jaw relative to the second stationary jaw when the second shaft is rotated, the moveable jaws and corresponding stationary jaws forming respective first and second vise assemblies, each vise assembly being capable of gripping or releasing a work piece placed therein; and
means for controlling the rotation of each shaft independent of the other shaft, and thereby operating the first and second vise assemblies independent of each other.

4,685,664

SHEET COPYING DEVICE

Gerhard Petersdorf, Pohlheim, Fed. Rep. of Germany, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 504,667, Jun. 15, 1983, abandoned.
This application Mar. 11, 1986, Ser. No. 838,886
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1982, 3223048
Int. Cl.[4] B65H *7/14*
U.S. Cl. 271—227 **3 Claims**



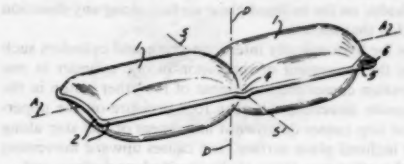
1. A sheet conveying device for conveying sheets in a predetermined direction of conveyance, comprising:
a pair of first sheet conveying rollers for conveying sheets;
a pair of second sheet conveying rollers provided downstream of said first sheet conveying rollers with respect to the direction of conveyance;
means for forming a loop in a sheet between said first and second sheet conveying rollers by conveying force of said first sheet conveying rollers;
means for displacing said second sheet conveying rollers nipping said sheet therebetween in a direction perpendicular to the predetermined direction of conveyance while maintaining the loop;
detector means for detecting the side edge of the sheet nipped between the second sheet conveying rollers displaced by said displacing means so as to stop said displacing means; and
means for returning said second sheet conveying rollers to a home position after the rear edge of the sheet has passed through said second sheet conveying rollers.

4,685,665

HAND EXERCISING DEVICE

Richard S. Carlisle, Box 307, Rye, N.Y. 10580

Continuation of Ser. No. 624,125, Jun. 25, 1984, abandoned.
This application Feb. 20, 1986, Ser. No. 833,416
Int. Cl.[4] A63B *5/00, 21/00*
U.S. Cl. 272—67 **10 Claims**



1. A hand-exercising device comprising first and second chamber means adapted to contain and be distended by fluid and proportioned to be grasped and alternately squeezed by the hands of the user, and connecting means physically connecting said chamber means to each other, said first chamber means and said connecting means and said second chamber means being disposed in the order named along a first direction, said connecting means having at least first and second portions spaced apart along a second direction transverse to said first direction, said first and second portions being the most widely spaced-apart portions of the connecting means, said hand-exercising device incorporating passage means for fluid transfer between said chamber means, said passage means being the entire means for fluid transfer between said chamber means, said passage means being essentially contiguous to said first portion and being effectively nearer to said first portion than to said second portion of the connecting means, said chamber means and said passage means and said connecting means being related to each other such that, when said chamber means are distended by fluid, said passage means tends to become either relatively open or constricted in response to angular shifting of one of said chamber means in relation to the other about an axis extending in a third direction orthogonally related to said first and second directions.

4,685,666

CLIMBING SIMULATION EXERCISE DEVICE

Richard J. DeCloux, 1485 Belmont St., Manchester, N.H. 03104

Filed Aug. 27, 1984, Ser. No. 644,389
Int. Cl.[4] A63B *23/04, 21/00*
U.S. Cl. 272—70 **14 Claims**

1. A trackless, self-aligning, exercise device, comprising:
a frame having a substantially flat unobstructed inclined plane surface;
a pair of piston cylinders, each having a rod end and a piston

extendable from the rod end, and a mounting end portion opposite to the rod end;

means for resiliently attaching the mounting end portion of each cylinder to the frame, in a position in relation to the inclined surface for disposition of the piston downwardly from the mounted cylinder and along the inclined plane surface and to permit angular movement of the cylinder and piston relative to the attaching means;

a step attached to the distal end of each piston rod and freely slideable on the inclined plane surface along any direction within that surface;

means for hydraulically interconnecting said cylinders such that the movement of the piston in one cylinder in one direction causes the movement of the other piston in the opposite direction, whereby foot pressure on the uppermost step causes downward movement of that step along the inclined plane surface, and causes upward movement of the other step along the inclined plane surface; and

each cylinder and piston having a nominal position from which each can be angularly deviated in response to pressure applied to the attached step.

4,685,667

AQUATIC EXERCISE SYSTEM

Malcolm C. McDonald, 933 W. Linwood, Phoenix, Ariz. 85007

Filed Jun. 9, 1986, Ser. No. 871,684

Int. Cl.[4] A63B *69/12, 31/10*

U.S. Cl. 272—71 **4 Claims**

1. An aquatic exercise system comprising a series of at least two separable, thin, plate-like resistance members, one of said resistance members having a larger face area than another of said resistance members, said resistance members each having a nearly identical pair of spaced openings in a central region thereof providing grip strips by which the resistance members can be grasped and held in the hand of the user when the members are disposed in face to face relationship with their openings in alignment, said resistance members being formed of light-weight, flexible material whereby the larger of the resistance members can be distorted when moved through the water in the grasp of an adult, the other of said resistance members serving to reinforce and prevent distortion of said larger resistance member when the resistance members are moved through the water in unison by the user.

4,685,668

WEIGHTLIFTING BELT

Thomas L. Newlin, Jr., 4310 Valparaiso, Pasadena, Tex. 77504

Filed Oct. 30, 1986, Ser. No. 924,747

Int. Cl.[4] A63B *13/00*

U.S. Cl. 272—123 **11 Claims**

1. A weightlifting belt, comprising a wide belt body of heavy duty, laterally flexible and stretchable webbing material,

first and second backing strips of regular duty webbing material equal in length with said belt body, each backing strip being equal to slightly less than half the width of said belt body,

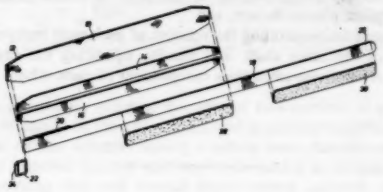
a holding strap of regular duty webbing material approximately equal in length to twice the length of said belt body and about as wide as said backing strips,

a hook loop-and-hook strip equal in width to said holding strap and equal in length to about one-half of said belt body,

a loop loop-and-hook strip equal in width and length to said hook strip,

a loop buckle suitable for accommodating to said holding strap,

said backing strips backing said belt body and aligned along the respective top and bottom edges of said belt body,



said holding strap being centered over said backing strips, a first end looped through said loop buckle and folded along said belt body and at one end thereof,

one of said hook and loop strips backing said holding strap at the other end of said belt body, the other of said hook strip and loop strip backing said holding strip from a starting point near its tip end, and

stitching of said backing strips to said belt body along their outer edges, of said holding strap folded end, of said holding strap to said backing strips and body belt, and of said hook strip and loop strip to said holding strap,

said stitching, backing strips and holding strap rigidifying said belt body against the tendency to flex and stretch to firmly support the user of the belt.

4,685,669

DESCENT SPEED CONTROL FOR EXERCISE STAIR

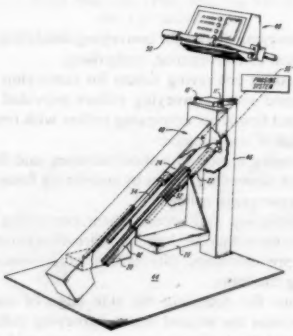
Richard J. DeCloux, 1485 Belmont St., Manchester, N.H. 03104

Filed Aug. 2, 1984, Ser. No. 636,908

The portion of the term of this patent subsequent to Oct. 16, 2001, has been disclaimed.

Int. Cl.[4] A63B *21/00*

U.S. Cl. 272—130 **19 Claims**



11. A simulated stair exercise device providing high-intensity exercise levels for providing beneficial cardiovascular exercise, comprising:

a frame;

means for mounting a pair of foot-stirrups to the frame for linear reciprocating motion respectively along first and second paths selectively inclined to the vertical in response to the user cyclically placing respective foot-stirrups in tension with the legs in such a way that respective foot-stirrups fall as the user cyclically tensions the foot-stirrups;

means for sensing the position of the foot-stirrups along their respective linear paths; and

means for variably controlling the rate at which the foot-stirrups fall in relation to the position of the foot-stirrups along their respective paths such that the center of gravity of the user cyclically moves between vertically spaced positions as the user cyclically tensions the foot-stirrups thereby expanding work in lifting the center of gravity of the user through the vertical spaced positions with attendant advantages to the cardiovascular system.

4,685,670

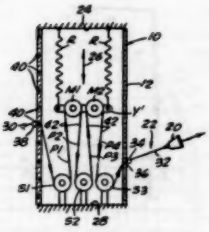
ELASTIC TENSION EXERCISING APPARATUS WITH MULTIPLE PASS CABLE AND PULLEY

Harold Zinkin, 2377 W. Shaw, Suite 112, Fresno, Calif. 93711

Filed Oct. 1, 1984, Ser. No. 656,780

Int. Cl.[4] A63B *21/04*

U.S. Cl. 272—136 **11 Claims**



1. An exercise apparatus comprising:

base means;

resistance means having a fixed portion held stationary relative to the base means and a movable portion capable of being displaced from said fixed portion against an elastic reactive force;

at least two primary semblant pulley means carried with the movable portion of the resistance means;

at least one secondary semblant pulley means mounted to the fixed portion of the resistance means at a location spaced from the primary pulley means;

a flexible force transmitting member threaded between the primary and secondary pulley means to engage one of the primary pulley means, one of the secondary pulley means and another of the primary pulley means, in sequence;

the force transmitting member having a first end held stationary relative to the base means and a second end actuable in tension by a user during an exercise to draw the primary pulley means toward the secondary pulley means and thereby stress the resistance means against said elastic force, said second end of the force transmitting member being actuable from a start condition to a subsequent extended condition and retracting toward the start condition upon release;

means for limiting said retraction so that the force transmitting member is tensioned by the resistance means in the start condition to provide a pre-selected range of resistive force during an exercise; and

means for adjusting the tension of the force transmitting member in the start condition, and thus the range of resistive force during an exercise, by adjusting the effective length of the force transmitting member, said tension adjusting means comprises means for adjusting said efective length at the first end of the force transmitting member.

4,685,671

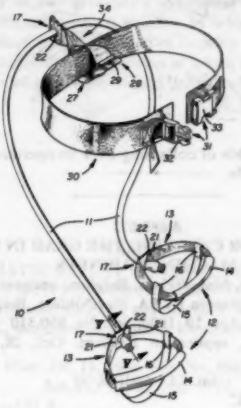
MULTI-PURPOSE EXERCISER

Gene R. Hagerman, Truckee; John W. Atkins, and John G. McMurtry, both of South Lake Tahoe, all of Calif., assignors to Sport Cord, Inc., South Lake Tahoe, Calif.

Filed Oct. 31, 1986, Ser. No. 926,002

Int. Cl.[4] A63B *21/02*

U.S. Cl. 272—139 **18 Claims**



1. An exerciser comprising

an elongated elastic member composed of an elastomeric material capable of stretching in response to imposition of a pulling force thereon,

a hand grip attached to each end of said member,

adjustment means for moving said grip to a selected position on said member and for frictionally holding said grip at said selected position when said pulling force is imposed thereon,

attachment means connected to said member and insertable between a door jamb and an outer edge of a door for holding said device in a fixed position between said door jamb and said door upon closing of said door, and

belt means for placement about a person's waist and connectable to said attachment means and to each said grip and buckle means for attaching ends of said belt means together.

4,685,672

GUESSING GAME AND ASSOCIATED PLAYING METHOD

Wayne L. Fillers, Rte. 7, Box 501, Greeneville, Tenn. 37743

Filed Sep. 24, 1985, Ser. No. 779,664

Int. Cl.[4] A63F *9/00*

U.S. Cl. 273—1 R **10 Claims**

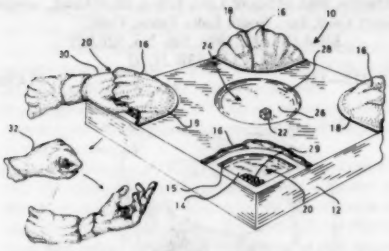
7. A guessing game for being played by a plurality of players, said game comprising:

a plurality of game pieces wherein said game pieces comprise small spherical members such as marbles;

a support structure provided with at least two indented receptacles for selectively receiving said game pieces, each said receptacle defining a playing position, said support structure being substantially square in configuration, defining four corners; and

a cover member operatively associated with each of said receptacles for concealing the contents of each said receptacle from the view of an opposing player, each said cover member secured at its forward edge to said support structure and defining an outwardly disposed opening for

allowing an associated player concealed access to said receptacle, said cover member fabricated of a flexible



material capable of collapsing over its operatively associated receptacle.

4,685,673

DEVICE FOR CARRYING THE GRAB IN SLOT MACHINE CABINETS

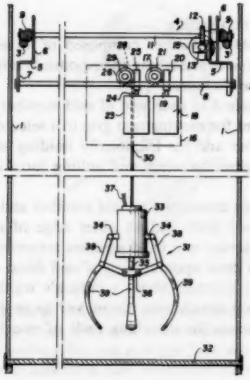
Achiel Verstraeten, Sint-Niklaas, Belgium, assignor to Elektro Automaten Verstraeten PVBA, Sint-Niklaas, Belgium

Filed Apr. 10, 1986, Ser. No. 850,310

Claims priority, application Belgium, Oct. 28, 1985, PV 2/60827

Int. Cl.[4] A63F 9/00

U.S. Cl. 273—1 GC **4 Claims**



1. A crane type slot machine adapted to lift a prize in the machine by means of a crane, comprising:

a cabinet having a prize area;

first guide rails spaced apart from each other, said guide rails being situated inside the cabinet above the prize area,

a traveller situated above the first guide rails and extending throughout the entire width of the cabinet perpendicular to the first guide rails, said traveller including a first driving shaft extending between the first guide rails, two first rollers each fixed to a respective end of the driving shaft and situated on the respective first guide rails, two side plates each having an upper part situated inside the first roller and a lower part situated adjacent the cabinet under the first guide rails, two parallel second guide rails situated between the lower parts of the side plates perpendicular to the first guide rails, and a first motor fixed to one of the side plates and operationally connected to the driving shaft so that when the first motor is operated, the traveller moves along the first guide rails,

a crab situated above the second guide rails, said crab including a second driving shaft extending between the second guide rails, two second rollers each fixed to a respective end of the second driving shaft and situated on the respective second guide rails, a second motor operationally connected to the second driving shaft so that when the second motor is operated, the crab moves along the second guide rails, a cable drum situated on the crab, a cable extending from the cable drum, and a third motor operationally connected to the cable drum so that when the third motor is operated, the cable drum rotates to wind or extend the cable, and

a grab connected to an end of the cable, said grab including a plurality of arms and means for actuating the arms, said actuating means, when actuated, operating the arms to move close to each other to thereby allow the arms to grab a prize, said actuating means, when not actuated, permitting the arms to locate away from each other.

4,685,674

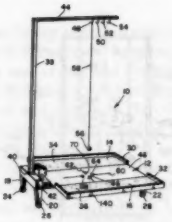
AIR-SWING BALL GAME

Alexander Toth, 1223 Del Rey; Apt. No. 5, Pasadena, Calif. 91107

Filed Mar. 21, 1986, Ser. No. 842,781

Int. Cl.[4] A63D 7/00

U.S. Cl. 273—40 **3 Claims**



3. A game comprising:

a. a game table having a flat upper surface for playing the game; and having a front end and a back end; and at least one peg-hole in said game table;

b. a pin-holder plate including at least one depending peg detachably inserted within said peg-hole to thereby provide a pin-holding surface on said playing surface;

c. at least one pin set upright on said pinholder plate;

d. a ball-swing support including a substantially vertical post detachably mounted at the back end of said game table, a horizontal arm detachably mounted on said post and extending forward toward the front of said game table;

e. four spaced hooks attached to said horizontal arm;

f. a string which may be attached at one end to any one of said four spaced hooks for making the game easier or harder; and

g. a ball attached to the other end of said string.

4,685,675

ADJUSTABLY WEIGHTED RACQUET

Melvin Heiman, 2500 Parkview Dr., Hallandale, Fla. 33009

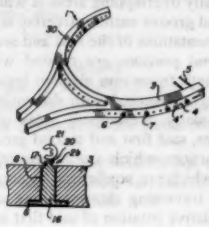
Filed Dec. 16, 1985, Ser. No. 809,243

Int. Cl.[4] A63B 49/04

U.S. Cl. 273—73 C **9 Claims**

1. Adjustably weighted racquet, comprising a head having a frame, said frame having a given number of holes distributed throughout said frame sufficient for completely stringing the racquet, said frame having a plurality of bores distributed throughout said frame, each of said bores being spaced from said holes, means for varying the weight and weight distribution of the racquet after string have been inserted in all of said holes without disturbing the strings, said varying means being in the form of a plurality of individual weights each being

insertible in a respective one of said bores and being individually movable from bore to bore without disturbing the strings



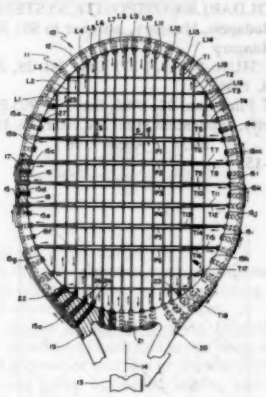
for weighting the racquet as desired, and means for detachably locking said weights in said bores.

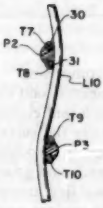
4,685,676

RACQUET STRUCTURE

Robert O. Boden, 1580 Gaywood Dr., P.O. Box 441, Altadena, Calif. 91001-0441

Filed Jan. 30, 1986, Ser. No. 824,161
Int. Cl.[4] A63B *49/00*
U.S. Cl. 273—73 D 8 Claims





6. The combination of a stringing grid and a plurality of elongated positioning elements for use in a tennis racquet or the like, said combination comprising:

a set of transverse strings being arranged in pairs with the two strings of each pair being in close proximity to one another and with successive pairs spaced apart, along substantially their entire length, a distance greater than the individual strings of a pair;

a set of longitudinal strings being interwoven with said pairs of transverse strings so that an individual longitudinal string in extending past a series of pairs of transverse strings is received alternately in front of and behind successive pairs of transverse strings, and a particular pair of transverse strings in extending past a series of longitudinal strings is received alternately in front of and behind successive ones of said longitudinal strings;

the two strings of each of said pairs of transverse strings being interwoven with said longitudinal strings in phase with one another so that both are received at the same side of each longitudinal string; and

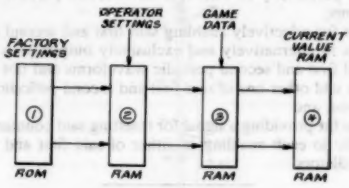
a plurality of elongated positioning elements each received between the two strings of a pair of said transverse strings and containing spaced notches in which said series of longitudinal strings is seated in locating relation and containing two elongated grooves in which the two strings of said pair of transverse strings are seated in locating relation.

4,685,677

AUTOMATIC REPLAY CONTROL SYSTEM AND METHOD FOR AMUSEMENT DEVICES

Lawrence E. Demar, Chicago, and Steven S. Ritchie, Evanston, both of Ill., assignors to Williams Electronics, Inc., Chicago, Ill.

Filed Jul. 11, 1986, Ser. No. 884,362
Int. Cl.[4] A63F *7/02, 9/22*
U.S. Cl. 273—121 A 9 Claims



6. A control system for automatically regulating, as a function of players' scores, the score award levels of an amusement game comprising:

(a) memory means for storing:

(i) data for award levels;

(ii) desired award percentage data;

(iii) game data, both current and historical;

(b) microprocessor means receiving the data stored in said memory means for periodically modifying the award level values to maintain said desired award percentage and giving player awards as earned;

(c) means for communicating data between the microprocessor means, the memory means, and for interfacing the system to game switches and displays;

whereby as player skill increases the microprocessor means adjusts the aware level values required to obtain an award.

8. A method for automatically regulating, as a function of players' scores, the score award levels of an amusement game comprising the steps of:

(a) storing in a computer memory:

(i) data for award levels;

(ii) desired award percentage;

(iii) game data, both current and historical;

(b) causing a computer to periodically modify the score award level values to maintain said desired award percentage and give player awards as earned;

whereby as player skill increases the score award level values required to obtain an award are raised and with decreasing player skill the award level values are lowered.

4,685,678

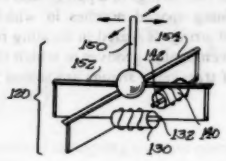
POSITION TRANSDUCER SYSTEM FOR A JOYSTICK

Jeffrey E. Frederiksen, Arlington Heights, Ill., assignor to Bally Manufacturing Corporation, Chicago, Ill.

Continuation of Ser. No. 408,004, Aug. 13, 1982, abandoned. This application Mar. 19, 1985, Ser. No. 713,482

Int. Cl.[4] A63F 9/22

U.S. Cl. 273—148 B **39 Claims**



1. A position transducer system comprising:

a first oscillator, having a first inductor having a first movable slug, for producing a first periodic waveform having its periodicity varied in response to the position of said first slug;

a second oscillator, having a second inductor having a second movable slug, for producing a second periodic waveform having its periodicity varied in response to the position of said second slug;

control means for moving at least one of said first and second slugs responsive to an external stimulus;

counter means for providing counter outputs responsive to the periodicity of said first and second periodic waveforms;

means for selectively enabling said first and second oscillators to alternatively and exclusively output each one of said first and second periodic waveforms and not to output said other one of said first and second periodic waveforms; and

means for providing a signal for resetting said counter means prior to each enabling of either of said first and second oscillators.

4,685,679

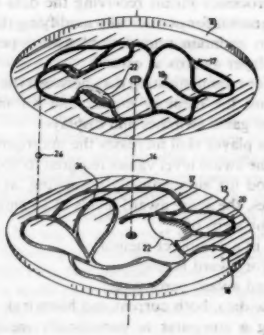
LABYRINTH PUZZLE

Ofer Ben-Gal, Simtat Avivim 6, Kfar Saba, and Nissim Sabatov, Ir HaYona 11, Tel Aviv, both of Israel

Filed Feb. 4, 1986, Ser. No. 826,088

Int. Cl.[4] A63F 9/08

U.S. Cl. 273—153 R **4 Claims**



1. A variable path labyrinth puzzle comprising first and second labyrinth defining portions which are movable with respect to each other about a common axis, said first and second labyrinth defining portions defining respective first and second facing surfaces, having formed thereon respective non-identical groove patterns, which together define said variable path which is formed of a plurality of sequentially defined, mutually overlapping areas at which the non-identical first and second groove patterns overlap at a plurality of different relative orientations of the first and second portions as the first and second portions are rotated with respect to each other, a labyrinth traversing element located in said variable path and being configured with dimensions such that it can pass only mutually overlapping areas of said non-identical groove patterns, said first and second groove patterns including groove portions which are not entirely circumferentially directed and which are configured to cooperate in displacing said labyrinth traversing element along said variable path in response to relative rotation of said first and second labyrinth defining portions, said first and second groove patterns also including groove portions configured in a curved not-entirely circumferential configuration which produce locking interaction between the labyrinth traversing element and the first and second portions against continued rotation in a given direction, whereby traversal by the labyrinth traversing element of the variable path is effected only by successive relative rotations of the first and second portions in predetermined directions and predetermined steps.

4,685,680

FOLDABLE COMPOSITE SYSTEM

Erno Rubik, Budapest, Hungary, assignor to 501 Rubik Studio, Budapest, Hungary

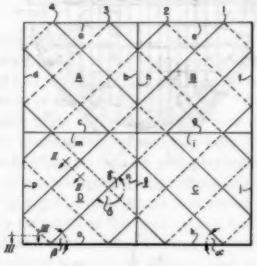
PCT No. PCT/HU86/00005, § 371 Date Jul. 28, 1986, § 102(e) Date Jul. 28, 1986

PCT Filed Jan. 22, 1986, Ser. No. 903,575

Claims priority, application Hungary, Mar. 29, 1985, 1211/85

Int. Cl.[4] A63F 9/08

U.S. Cl. 273—155 **13 Claims**



1. A composite array, comprising:

a plurality of array elements, said elements being generally plate-like in form, each said element including

upper and lower generally flat surfaces;

first and second groups of grooves formed in each said surface,members of each said group being mutually parallel, with grooves of said first group intersecting grooves of said second group to enclose angles, grooves formed in one said surface being in overlying registration with grooves on the other said surface;

sides, surrounding and joining said surfaces, each side including side intersection points at which at least two said grooves on each said surface mutually intersect and intersect said side of each said element abutting at least one other said element;

fastening means looped on said elements for fastening said elements within the array, said fastening means disposed in preselected ones of said grooves and forming at least one hinge point between each said element and at least one other said element, enabling a selected element to rotate about said hinge point into a position in contact with said

other element, further rotation of said element in a selected direction different from the first said rotation causing said hinge point to migrate to different sides of both said elements, thereby changing the sides upon which the two said elements abut.

4,685,681

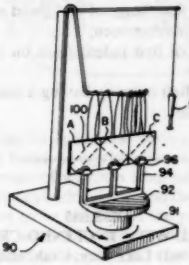
COMPOSITE ARRAY APPARATUS AND METHOD

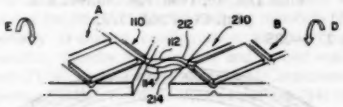
Erno Rubik, Budapest, Hungary, and Cheung K. Fai, Hong Kong, Hong Kong, assignors to 501 Rubik Studio, Budapest, Hungary

Continuation-in-part of Ser. No. 903,575, Jul. 28, 1986. This application Aug. 20, 1986, Ser. No. 898,468

Int. Cl.[4] A63F *9/08*

U.S. Cl. 273—155 **15 Claims**





1. A composite array, comprising:

a plurality of array elements, each said element abutting at least one other said element and including

upper and lower generally flat surfaces;

first and second groups of grooves formed in each said surface, members of each said group being mutually parallel, with grooves of said first group intersecting grooves of said second group to enclose angles, grooves formed in one said surface being in overlying registration with grooves on the other said surface;

sides disposed peripherally about and joining said surfaces, each side including side intersection points at which at least two said grooves on each said surface mutually intersect and intersect said side;

paired retaining means looped on said elements within said grooves for retaining said elements within the array, said retaining means forming at least one hinge point comprised of said paired retaining means between each said element and at least one other said element, enabling a selected element to rotate about said hinge point into a position in contact with said other element, further rotation of said element in a selected direction different from the first said rotation causing said hinge point to migrate to different sides of both said elements, thereby changing the sides upon which the two said elements abut.

14. A method for assembling a composite array of plate-like elements, comprising the steps of:

providing a plurality of plate-like elements, each element having first and second groups of grooves formed in each said surface, members of each said group being mutually parallel, and grooves of said first group intersecting grooves of said second group to enclose angles, grooves formed in one said surface being identical to grooves on the other said surface;

arranging said elements in a selected pattern, at least one side of each said element abutting a side of an adjacent element;

looping a plurality of endless filaments in preselected paths around said elements within said grooves, for each element,

wrapping a said filament around said element at selected element sides and turning said filament to lead same into a groove on the opposite side of said element, said groove lying at an angle to the groove from which said filament emerges, and at selected other element sides,

passing said filament from said element to an abutting element, leading said filament into a groove in said abutting element lying in substantially a straight line with the groove from which said filament emerges and on the side of said abutting element opposite the side of said first element from which said filament emerges.

4,685,682

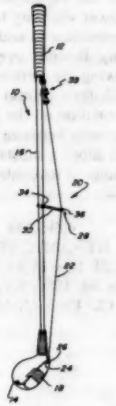
ADJUSTABLE FLEX GOLF CLUB

James T. Isabell, P.O. Box 4017, Grand Junction, Colo. 81502

Filed Jun. 10, 1985, Ser. No. 742,903

Int. Cl.[4] A63B *53/00, 69/36*

U.S. Cl. 273—162 R **5 Claims**



5. A golf club having a shaft, club head and grip for use in determining the amount of shaft flexibility a given golfer requires to optimize the golfer's club head speed during a swing, comprising in combination:

flexure limiting means interconnecting the club head and the shaft, said flexure limiting means held at a spaced distance away from said shaft by a bridge adjustably connected thereto to vary its distance therefrom and connected to the shaft at a point at least one-half the golf club length away from the club head, said flexure limiting means for limiting the extent to which the shaft flexes as the club head is moved through a downward swing to strike a golf ball and including a tension adjustment assembly containing a wire interconnecting the club head to said shaft passing over the bridge projecting away from the shaft and adjustably connected to the shaft so as to vary the distance the bridge projects from the shaft and the resulting tension in said wire, said tension adjustment assembly operative for increasing or decreasing the tension in the wire, respectively decreasing or increasing the extent to which the shaft flexes during the downward swing.

4,685,683

FLEXIBLE ENVELOPE SEAL AND SEALING METHOD

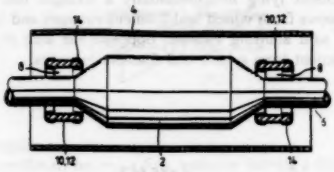
Robert L. Hall, Surrey, United Kingdom; Joris R. I. Franckx, Bonheiden, Belgium; Noel M. M. Overbergh, Bertem, Belgium; Jos Doucet, Kessel-Lo, Belgium, and Jan Vansant, Korbeek-Lo, Belgium, assignors to Raychem Corporation, Menlo Park, Calif.

Filed Jul. 27, 1983, Ser. No. 517,541

Claims priority, application United Kingdom, Jul. 26, 1982, 8221597; Dec. 21, 1982, 8236229; Jan. 24, 1983, 8301887

Int. Cl.[4] F16J *15/06;* **H02G** *15/04;* **B29C** *6/04*

U.S. Cl. 277—1 **37 Claims**



20. A seal for preventing passage of fluid between substrates which comprises:

a closed envelope of a flexible material; and

a void-filling composition within the envelope which is capable whilst in the envelope of undergoing a change from a state of lower viscosity to a state of higher viscosity and of then remaining in said state of higher viscosity;

said envelope being flexible over substantially its entire surface thus allowing the surface to conform to that of the substrates by bulk flow of said composition and then to retain that conformation on the change of viscosity of the composition; the ratio between the volume of the envelope if it were to adopt a substantially circular cross-section and the volume of its contents being from 2–9.

4,685,684

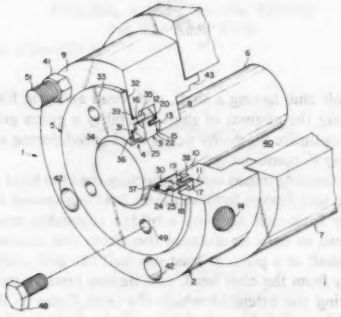
DYNAMIC SEAL

Michael J. Ballard, P.O. Box 15384, Baton Rouge, La. 70895

Filed Feb. 14, 1986, Ser. No. 830,513

Int. Cl.[4] F16J *15/447, 15/54*

U.S. Cl. 277—57 **19 Claims**



1. A dynamic sealing device, comprising:

a. a gland, fixedly connectible to a housing around a rotatable shaft and having:

i. a first side, facing interior of said housing;

ii. a second side, facing exterior of said housing;

iii. a center opening, communicating between said first and second sides and having a diameter greater than that of said rotatable shaft;

iv. an annular inner face, countersunk into said second side adjacent to said center opening so as to form an interior groove between said shaft and said gland;

v. an annular first flange, extending axially from said inner face; and

vi. at least one relief port, communicating between said interior groove and the exterior of said gland;

b. a rotating member, fixedly connectible to said rotatable shaft and having:

i. a first face, facing toward said second side of said gland;

ii. a second face, facing away from said gland;

iii. an outer annular surface between said first face and said second face;

iv. an outer diameter such that said rotating member will fit within said interior groove of said gland;

v. an annular sealing groove, having an inner wall and an outer wall, positioned in said first face so as to matingly receive said first flange of said gland and permit relative movement therebetween;

vi. a plurality of first indentations on said outer annular surface; and

vii. a central shaft opening having a diameter just greater than said shaft.

4,685,685

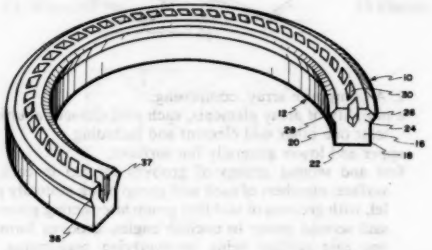
MOLDED SEAL WITH INCLINED CROSS BRACES

Dennis H. Iverson, Salt Lake City, Utah, assignor to Cyl - Pak, Inc., Salt Lake City, Utah

Filed Dec. 16, 1986, Ser. No. 942,178

Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—205 **4 Claims**



1. An annular sealing ring with a generally Y-shaped cross-section for sealing between a piston and a curved wall of a cylinder comprising a base, and a pair of sealing lips for contact with said piston and said curved wall;

said base having a generally rectilinear cross-section defined by a horizontal bottom surface, a pair of spaced vertical side surfaces extending upwardly from opposite ends of said horizontal bottom surface;

said pair of sealing lips spaced apart and extending from said base, each lip having a slanted side surface projecting upwardly and outwardly from one of said vertical side surfaces, a horizontal top surface extending inwardly from the top end of said slanted side surface whereby a sealing edge is formed by the intersection of said slanted side surface and said horizontal top surface;

said pair of lips also having corresponding, similarly opposed, inner surfaces including a first pair of inner surfaces extending downwardly from said horizontal top surfaces, a second pair of slanted inner surfaces converging and extending downwardly from said first pair of inner surfaces, said inner surfaces forming the boundary of a cavity; and

a plurality of braces connecting said lips, said braces joining the lips to form oblique or acute angles.

4,685,686

SEALING CAP FOR A BOLT GUIDE OF A SPOT-TYPE DISC BRAKE

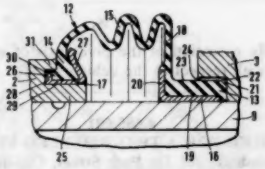
Rolf Weiler, Frankfurt/Main-Sindlingen, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed May 20, 1985, Ser. No. 736,427

Claims priority, application Fed. Rep. of Germany, May 19, 1984, 3418806

Int. Cl.[4] F16J *3/04, 15/52*

U.S. Cl. 277—212 FB 13 Claims



1. A sealing cap for cylindrical parts such as a bolt guide of a spot-type disc brake, comprising an elastic pleated bellows, the one end portion of which is adapted to be secured at the periphery of a first cylindrical part and the other end portion of which is adapted to be secured at the periphery of a second cylindrical part, wherein a rigid reinforcing and retaining member is provided on at least one of said end portions, with each reinforcing and retaining member being arranged on the same radius with at least part of its radial extension, wherein at least one of the reinforcing and retaining members (**17,33**) is of substantially U-shaped configuration in axial longitudinal cross-section, thereby forming first and second wall portions (**28**) and (**27;36**), and a base portion (**29;34**) interconnecting the wall portions which embrace the end portion (**14**) of the sealing cap in a bracket-like configuration, and wherein one of the wall portions (**28**) is arranged in an annular groove (**26**) which is designed in the corresponding cylindrical part.

4,685,687

WORKHOLDER

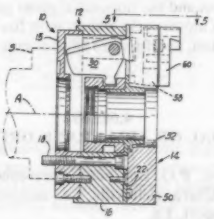
William E. Hall, Solon; Edward D. Gailey, Mentor, and George J. Ovanin, Euclid, all of Ohio, assignors to The S-P Manufacturing Corporation, Cleveland, Ohio

Continuation of Ser. No. 410,258, Aug. 23, 1982, Pat. No. 4,550,922. This application Sep. 6, 1985, Ser. No. 773,322

The portion of the term of this patent subsequent to Nov. 5, 2002, has been disclaimed.

Int. Cl.[4] B23B *31/12*

U.S. Cl. 279—119 9 Claims



1. A power operated workholder assembly comprising a power subassembly and a workholding subassembly separable to permit removal of the workholding subassembly as a unit from the power subassembly without disassembly of either; the power subassembly comprising a first body and power-actuable means for exerting a force when actuated; the workholding subassembly comprising a second body and work gripping means carried by the second body movable relative to the second body; said power-actuable means and said work gripping means being releasably interengaged to transmit force between the two and disengageable to allow separation; connecting means carried by at least one of the bodies to separably connect and retain the first and second bodies tightly together; and means associated with at least one of the bodies to operate the connecting means to retain the bodies tightly together.

4,685,688

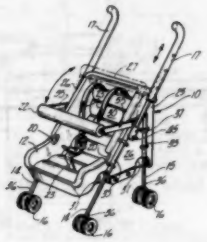
COMBINED CHILD SAFETY CAR SEAT AND STROLLER

Gregory S. Edwards, 8621 Edgewood, Detroit, Mich. 48213

Filed Feb. 14, 1985, Ser. No. 701,746

Int. Cl.[4] B60F *5/00*

U.S. Cl. 280—30 7 Claims



6. A combined safety car seat and stroller for children comprising:

a seat formed of a resilient, substantially rigid and crush resistant material;

means for receiving an automobile safety seat belt included on said seat;

two handles attached to opposite lateral sides of said seat and having a first position wherein said handles extend above said seat and a second position wherein said handles are laterally adjacent said seat, said handles being pivoted relative to the seat when folded into its second position;

a plurality of legs attached to said seat, said legs being telescopically movable between a first position wherein said legs extend below said seat and a second position wherein said legs are laterally adjacent said seat, said legs each having a wheel attached to an end of each leg opposite the seat in the first position; and,

wherein said handles interlock with the wheels when said handles are placed in their second position and the legs are placed in their second position whereby the combined safety car seat and stroller may be used as a car seat.

4,685,689

VEHICLE SUSPENSION RESPONSIVE TO VERTICAL ACCELERATION AND CHANGE IN HEIGHT

Shozo Takizawa; Minoru Tatemoto, both of Okazaki; Akio Furumura, Toyota; Tadashi Sugawara, Okazaki; Shigeo Kariya, Nagoya, and Kazuo Hiroshima, Okazaki, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 28, 1985, Ser. No. 738,667

Claims priority, application Japan, May 31, 1984, 59-109527; May 31, 1984, 59-109528; May 31, 1984, 59-109531; May 31, 1984, 59-80643[U]; May 31, 1984, 59-80644[U]

Int. Cl.[4] B60G *17/00*

U.S. Cl. 280—707 17 Claims

1. A vehicle suspension apparatus comprising:

fluid spring chambers provided between wheels and a vehicle body for controlling a vehicle height;

fluid supply means for supplying a fluid from a fluid supply source to the fluid spring chambers through supply valves;

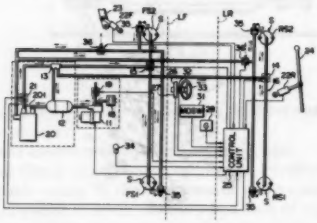
fluid exhaust means for exhausting the fluid from the fluid spring chambers through fluid exhaust valves;

a vehicle height sensor for detecting a vehicle height;

an acceleration sensor for detecting the upward and downward accelerations acted on the vehicle body;

vehicle height control means for controlling the fluid supply valves or the fluid exhaust valves to control the vehicle height toward a target vehicle height by comparing the vehicle height detected by the vehicle height sensor with a set target vehicle height;

rough road judging means for judging a rough road when satisfying a first condition for detecting more than a predetermined number of the vehicle heights exceeding a set range of the vehicle height within a set period of time by the vehicle height sensor or satisfying a second condition for detecting more than a predetermined number of changes of the acceleration exceeding a set range of the



acceleration within a set period of time by the acceleration sensor and eliminating the judgment of the rough road when not satisfying any of the first and second conditions; and

target vehicle height set means for setting a normal vehicle height as a target vehicle height in the control means at a normal condition and setting a vehicle height higher than the normal vehicle height as a target vehicle height when the judgment of the rough road is made by the rough road judgment means;

wherein after said rough road judgment is presented by said rough road judging means, said rough road judging means or said target vehicle height set means is constructed to hold the vehicle height at the high vehicle height at the set time from that time when any of the first and second conditions is not satisfied by said vehicle height sensor and said acceleration sensor.

4,685,690

SUSPENSION APPARATUS OF VEHICLE

Haruyasu Fujita, Tokyo; Masao Ogawa, Shiki, and Takahisa Suzuki, Omiya, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 9, 1985, Ser. No. 806,914

Claims priority, application Japan, Dec. 26, 1984, 59-272777; Feb. 25, 1985, 60-34629; Feb. 25, 1985, 60-34630; Feb. 25, 1985, 60-34631; Apr. 5, 1985, 60-70785

Int. Cl.[4] B62D *9/02;* **B60G** *21/00*

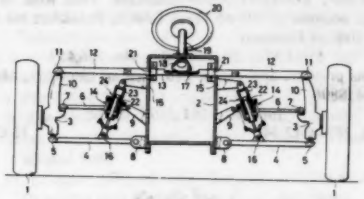
U.S. Cl. 280—112 A **3 Claims**

1. A suspension apparatus of a vehicle disposed between a pair of right and left vehicle wheels and a vehicle body comprising:

a suspension spring which is expanded and contracted by feeding fluid thereto and discharging the fluid therefrom;

a control valve comprising a rotary valve attached to said suspension spring and adapted to control the feeding and the discharging of the fluid; and

a swingable piece pivotally attached at one end to a steering member reciprocally movable in the right and left direction and at the other end to a valve body of said control valve, so that the swingable piece is swung according to reciprocal movement of said steering member to rotate said valve body; the pivot axis of said swingable piece with respect to said steering member being disposed on a



generally extension of the pivot axis of said suspension spring with respect to the vehicle body.

4,685,691

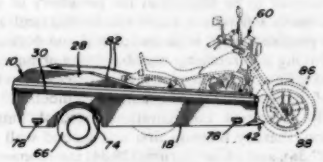
TRAILER FOR A TWO-WHEELED VEHICLE

Ronaldo Tremblay, 261 Du Parc Street, Cap-de-la-Madeleine, Province of Quebec, Canada G8V 1V2

Filed Jun. 4, 1986, Ser. No. 870,408

Int. Cl.[4] B62K *27/12*

U.S. Cl. 280—204 **3 Claims**



1. In combination, a two-wheeled motorcycle and a trailer to be towed by the motorcycle; said trailer comprising a generally rectangular rigid frame including a front bar member; elongated load-carrying side casings and a load-carrying rear casing; said front bar member secured to the underside of said side casings and defining and intermediate flattened V-shaped section, transversely extending between the motorcylce engine block and its front wheel, and the legs of which are forwardly outwardly diverging; a transverse two-wheel axle mounted under said rear casing portion, for supporting the side casings and rear casing portion spacedly above the ground and around the motorcycle; the rearwardly-directed apex of said bar V-shaped portion detachably connected by a universal joint connector to said motorcycle just ahead of said engine block for relative movement of said trailer and motorcycle about pitch and roll axes; said connector being located below said bar V-shaped portion and the horizontal plane passing through the axles of the two motorcycle wheels with the motorcycle being in upright position, and forward of the center of gravity of the motorcycle.

4,685,692

FOOT PEDAL OR ARM CRANK DRIVEN RIDING BICYCLE

Tom P. Fullilove, P.O. Box 6063, Shreveport, La. 71106, and Frank L. Dahlberg, Keithville, La., assignors to Tom P. Fullilove, Shreveport, La.

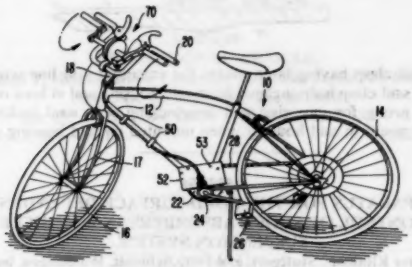
Filed Sep. 15, 1986, Ser. No. 907,015

Int. Cl.[4] B62M *1/00*

U.S. Cl. 280—234 **2 Claims**

1. For use with a riding bicycle of the type having a substantially rigid frame having a rear driving wheel, a front steering wheel and a sprocket carried by a foot pedal-operated shaft and drivingly connected to the rear wheel, the invention comprising a handlebar stem for connection to a steering for pivot-

ally connected to said frame for rotatably supporting said front wheel, a handlebar carried by said stem, hand driving mechanism also carried by said stem comprising a rotatable shaft and a two part sleeve receiving said shaft, means connecting one of the parts of said sleeve to said stem in vertically spaced relation with respect handlebar and substantially parallel thereto, bearing means in each part of said sleeve rotatably supporting said shaft, a first bevel gear fixed to said shaft to one side of the axis of said stem, the opposite ends of said shaft terminating proximate the outer ends of said sleeve parts, a hand crank arm angularly adjustably connected to each of the ends of said



shaft, a first bevel pinion engaging said first bevel gear, a second bevel gear for attachment to said foot pedal operated shaft, a second bevel pinion for attachment to said frame and drivingly engagable with said second bevel gear, a flexible shaft interconnecting said first and second bevel pinions, a flexible sheath surrounding said flexible shaft between said first and second pinions, and complementary housing components carried by the inner end of each part of said two part sleeve, said housing components cooperating with each other and with that end of said sheath adjacent said first pinion to define a housing to said one side of the axis of said stem enclosing said first bevel gear and said first pinion.

4,685,693

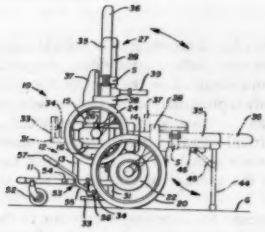
UPRIGHT WHEELCHAIR

Carl F. Vadjunec, 130 N. Portland, Youngstown, Ohio 44509

Filed Sep. 16, 1986, Ser. No. 908,010

Int. Cl.[4] A47C *13/00*; B62D *51/00*

U.S. Cl. 280—242 WC **5 Claims**



1. An upright wheelchair having a main support frame, with upstanding side frame configurations, main support wheels and multiple directional wheels on said main support frame, a back body support pivotally secured between said upstanding side frame configurations, inner-drive wheels secured in spaced relation to said main support wheels, secondary drive wheels vertically aligned with said inner-drive wheels and rotatably engaging same in reverse direction and said main support wheels, means on said back body support for locking same in vertical position, means on said back body support for supporting same in horizontal position, means for supporting a chair user in upright position on said back body support, secondary means for securing the user on said back body support, means for locking said main support wheels, inner-drive wheels and said secondary drive wheels.

4,685,694

STEERING APPARATUS OF VEHICLES

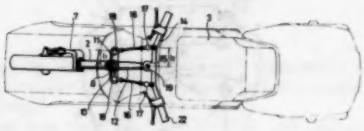
Mikihiro Kouyama, Kawagoe, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 31, 1985, Ser. No. 760,795

Claims priority, application Japan, Aug. 7, 1984, 59-120646[U]

Int. Cl.[4] B62K *21/00*

U.S. Cl. 280—270 **7 Claims**



1. A steering apparatus for a vehicle having a driver seat located substantially between a front wheel and a motor comprising:

a head pipe affixed to a vehicle frame;

a steering stem coaxially positioned within said head pipe;

a handle supporting member projecting rearwardly in the inside of said head pipe means;

a handle pivotally mounted on the top portion of said handle supporting member;

a top plate mounted on the top of said steering stem; and

a connecting rod directly connecting said handle and said top plate.

4,685,695

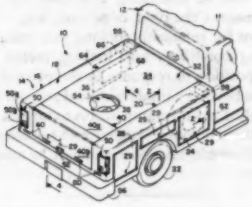
WATERTIGHT, SECURED TRUCK ENCLOSURE

Robert C. LeVee, 12719 NE. 7th Pl., Vancouver, Wash. 98664

Filed Dec. 16, 1985, Ser. No. 809,020

Int. Cl.[4] B62D *53/06*

U.S. Cl. 280—423 B **8 Claims**



1. A secured enclosure in combination with a pickup truck frame comprising:

a multi-compartmental structure, each compartment therein having an opening and closure means associated therewith, said closure means having a watertight seal at its juncture with said compartment opening; and

a hitch receiving watertight well formed in said structure extending between a top side thereof and a bottom side thereof for receiving a hitch for attaching a towed vehicle threto, said well having a substantially frusto-conical form.

4,685,696

FRONT PIECE FOR A SAFETY SKI-BINDING

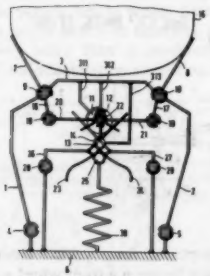
Gerhard Sedlmair, Farchant; Walter Knabel, Murnau, and Werner Messerschmidt, Garmisch-Partenkirchen, all of Fed. Rep. of Germany, assignors to Marker International, Salt Lake City, Utah

Filed Aug. 5, 1985, Ser. No. 762,915

Claims priority, application Fed. Rep. of Germany, May 12, 1983, 3343943; PCT Int'l Appl., Dec. 4, 1984, PCT/EP83/00386

Int. Cl.[4] A63C 9/085

U.S. Cl. 280—625 8 Claims



1. A front piece for a safety ski binding, said front piece comprising:

base means mountable between the sides of a ski;

supporting means mounted for sideways movement on said base means, said supporting means including:

side clamp means for engaging the sides of a ski boot, said side clamp means having a holding condition for holding a ski boot in the front piece and an open condition for releasing a ski boot;

coupling means interconnecting said side clamp means;

mounting means for pivotally attaching said side clamp means to said coupling means; and,

extension means attached to said mounting means beyond the point of pivotal attachment of said side clamp means to said coupling means for extending the effective length of said side clamp means;

releasing means connected to said extension means for controlling the condition of said side clamp means, said releasing means having a locking condition for restraining said extension means to lock said clamp means in the holding condition and an unlocking condition for enabling said clamp to assume the open condition; and,

locking means for releasably locking said releasing means in the locking condition, said locking means moving to a releasing position in response to the pivoting of said support means beyond a predetermined amount in response to forces applied to said clamp means to unlock said releasing means to the unlocking condition to release said extension means and enable said clamp means to assume the open condition.

4,685,697

RETRACTABLE SKI LEASH DEVICE EMBODYING DUAL PURPOSE LOCKING MEANS

Neil R. Thorley, 5236 N. 73rd Pl., Paradise Valley, Ariz. 85253

Filed Sep. 11, 1986, Ser. No. 906,131

Int. Cl.[4] A63C 11/02

U.S. Cl. 280—637 6 Claims

1. A dual purpose ski recovery and locking device comprising:

a housing,

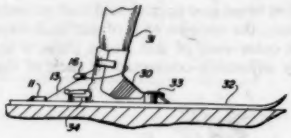
a clasp detachably mounted on said housing,

a spring biased retractable spool journalled in said housing,

a line fastened at one end to said spool and wound thereabout with the free end thereof exposed on the periphery of said spool,

a locking means mounted in said housing for engaging and releasing said clasp from said housing, and

means for attaching the free end of said line to said clasp,



said clasp having latch means for engaging said line when said clasp is disengaged from said housing and at least one prong for engaging and interlocking with said locking means in said housing when mounted on said housing.

4,685,698

APPARATUS FOR THE ROAD-SURFACE-DEPENDENT CONTROL OF SHOCK ABSORBERS IN A VEHICLE SUSPENSION SYSTEM

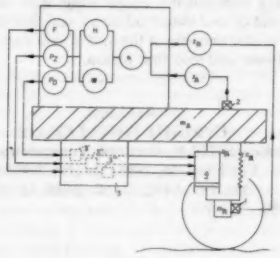
Walter Klinkner, Stuttgart, and Fritz Schmidt, Waiblingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed May 23, 1986, Ser. No. 866,377

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518503

Int. Cl.[4] B60G 17/04

U.S. Cl. 280—707 11 Claims



1. Apparatus for controlling of a vehicle suspension system in response to road surface conditions, comprising:

sensor means, mounted on the vehicle, for producing electrical signals representative of road surface undulations;

circuit means, connected to the sensor means, for receiving the electrical signals from the sensor means and for processing these signals to produce control signals representative of the average heights of the road surface undulations;

damping means for damping vibrations in the vehicle suspension system, said damping means having at least two chambers which communicate via a controllable bypass, wherein one of said chambers becomes smaller during compression of the suspension system and another of said chambers becomes smaller during expansion of the suspension system, said damping means having at least one of a controllable throttle and a controllable valve in said bypass; and

means for connecting the control signals produced by the circuit means to the controllable bypass, and for controlling the bypass with said signals;

wherein, the circuit means produces a first control signal (H) which is representative of the average height of the overall road surface undulations, and a second control signal (w) which is representative of a ratio of average heights

for long-wave and short-wave undulations, and wherein said circuit means further processes the first and second control signals to produce at least one of a third control signal (F) for controlling the controllable throttle and a fourth signal (P) for controlling the controllable valve, in accordance with the following relationships:

$$P=a_0+a_1H+a_2w+a_3Hw$$

$$F=b_0+b_1H+b_2w+b_3Hw$$

where, a_0-a_3 and b_0-b_3 are predetermined constants.

4,685,699

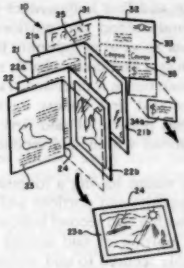
PROMOTIONAL ARTICLE

Ronald T. Hirasawa, 753 Longwood Dr., Lake Forest, Ill. 60045

Filed Jan. 22, 1986, Ser. No. 821,410

Int. Cl.[4] B42D *1/00*; **G09B** *1/00, 1/04*; **G09F** *3/00*

U.S. Cl. 281—15 R **7 Claims**



1. A promotional article including a front cover and a back cover, and a plurality of sheets located between said covers, wherein said promotional article further comprises:

at least one removable incentive gift sheet having a first and a second side and located between said front and back covers,

said at least one incentive gift sheet comprising gallery quality paper and including printed matter comprising a scene of aesthetic interest on its first side, and promotional printed matter on its second side; and

a redemption card support sheet,

said redemption card support sheet including at least one removable redemption card relating to said promotional printed matter on said at least one incentive gift sheet, wherein said redemption support sheet does not comprise said at least one incentive gift sheet such that removal of said redemption card does not deface said at least one incentive gift sheet.

4,685,700

BOOKBINDING STRIPS AND METHOD OF BINDING BOOKS

William H. Abildgaard, Redwood City, Calif., assignor to Velo Bind, Inc., Sunnyvale, Calif.

Filed Oct. 22, 1984, Ser. No. 663,214

Int. Cl.[4] B42D *13/00*; **B42F** *13/36, 13/00*; **B21F** *45/22*

U.S. Cl. 281—21 R **9 Claims**

1. A book comprising

a core comprising a plurality of sheets, each sheet being formed with at least four first holes spaced apart longitudinally and inwardly of the spine edge of said sheet;

a first strip overlying the spine edge of said core on one side of said book having a plurality of integral round, smooth, flexible plastic studs integral with said first strip and bendable at approximately a 90° angle spaced the same intervals as said first holes extending outward of said first strip;

a second strip overlying the spine of said core on the side of said book opposite said first strip formed with a plurality of second holes spaced the same intervals as said first holes, and for each said second hole a separate, smooth-walled groove in the outer surface of said second strip communicating with and extending away from said second hole and being of a length slightly longer than the length of said studs, each said groove having stud retaining means comprising at least one smooth-surfaced over-

hanging lip extending longitudinally substantially the entire length of said groove adjacent only the outside of said groove;

each said stud extending outward from said first strip through said first holes in said core and one said second hole and being bent at approximately a 90° angle and snapped down into one said groove and under said overhanging lip so that said stud is held in place in said groove.

4,685,701

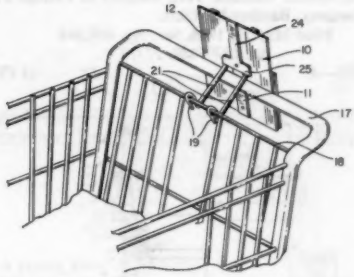
SHOPPING CART CADDY

Anita L. Amundson, 1133 New Pear St., Vineland, N.J. 08360, and Joseph Tokay, 1 Tree La., Levittown, Pa. 19054

Filed Jul. 16, 1986, Ser. No. 886,172

Int. Cl.[4] B42D *9/00, 17/00*; **G09F** *9/00*; **A47B** *5/00*

U.S. Cl. 281—42 **10 Claims**



1. A shopping cart caddy comprising a backbone bar, a pair of leaves hinged to opposite sides of the backbone bar and adapted to lie substantially in a common plane with the backbone bar and to be folded approximately into parallelism, shopper convenience items carried by corresponding faces of said leaves, a pair of hooks releasably engageable with a horizontal rod of a shopping cart, a bifurcated member including a pair of parallel arms carrying said hooks and being pivotally secured to the caddy intermediate the length thereof, and a stop element on the caddy engageable with said arms to positively limit swinging movement of the arms away from the backbone bar in one direction whereby said arms and backbone bar may assume a predetermined acute angular relationship and the arms and backbone bar straddle and come to rest solidly on a push bar of a shopping cart when in use, with said leaves and backbone bar disposed at a convenient angle for reading.

4,685,702

LABEL PRINTER

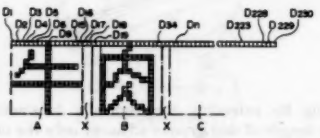
Teraoka Kazuharu, Tokyo, Japan, assignor to Teraoka Seikosho Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 529,643, Sep. 6, 1983, abandoned, which is a division of Ser. No. 238,104, Feb. 25, 1981, abandoned. This application Dec. 16, 1985, Ser. No. 808,677

Claims priority, application Japan, Feb. 26, 1980, 55-23260; Feb. 26, 1980, 55-23261; Feb. 28, 1980, 55-24604; Jul. 3, 1980, 55-91077; Jul. 4, 1980, 55-91294; Jul. 14, 1980, 55-98296; Sep. 6, 1980, 55-123835; Sep. 6, 1980, 55-127050

Int. Cl.[4] B42D *15/00*

U.S. Cl. 283—81 **11 Claims**



1. A label comprising a substrate and on which a bar code has been printed by a dot printer with a printing head having a line of printing elements arranged in a first direction, the label and printing head being moved relatively in a second direction while the elements are selectively activated thereby to print on the label at least a portion of printing extending in the first direction, wherein the label further comprises a check pattern thereon created by the printing elements which extends in said first direction to at least the same extent as said portion of printing and also extends in said second direction, said check pattern indicating if any of said elements is not working by an unprinted line extending in the second direction in said check pattern.

4,685,703

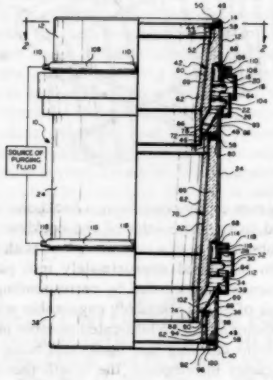
EXPANSIBLE AND CONTRACTIBLE DUCT

Timothy A. Brock, Watauga, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed May 27, 1986, Ser. No. 868,364

Int. Cl.[4] F16L *27/12*

U.S. Cl. 285—47 **13 Claims**



1. A longitudinally expansible and contractible duct, comprising:

a first hollow duct member having a longitudinal axis and first and second opposite end portions;

first hollow bellows means having a longitudinal axis and first and second opposite end portions with the first end portion thereof being secured in fluid flow communication to the second end portion of said first hollow duct member;

a second hollow duct member having a longitudinal axis and first and second opposite end portions with the first end portion thereof being secured in fluid flow communication to the second end portion of said first hollow bellows means;

second hollow bellows means having a longitudinal axis and first and second opposite end portions with the first end portion thereof being secured in fluid flow communication to the second end portion of said second hollow duct member;

a third hollow duct member having a longitudinal axis and first and second opposite end portions with the first end portion thereof being secured in fluid flow communication to the second end portion of said second hollow bellows means;

first hollow baffle means having a longitudinal axis and first and second opposite end portions and being at least partially disposed within said first hollow duct member with the first end portion of said first hollow baffle means being movably secured to said first hollow duct member intermediate the first and second end portions of said first hollow duct member so as to permit only limited relative movement between said first hollow baffle means and said first hollow duct member in a direction transverse to the longitudinal axis of said first hollow duct member and with the second end portion of said first hollow baffle means being positioned within said second hollow duct member; and

second hollow baffle means having a longitudinal axis and first and second opposite end portions and being at least partially disposed within said second hollow duct member with the first end portion of said second hollow baffle means being movably secured to said second hollow duct member intermediate the first and second end portions of said second hollow duct member so as to permit only limited relative movement between said second hollow baffle means and said second hollow duct member in a direction transverse to the longitudinal axis of said first hollow duct member and with the second end portion of said second hollow baffle means being positioned within said third hollow duct member.

4,685,704

CUFF FOR SEALING JOINTS OF PIPES

Robert Kolar, Vaduz, Liechtenstein, assignor to Steinburg Aktiengesellschaft, Vaduz, Liechtenstein

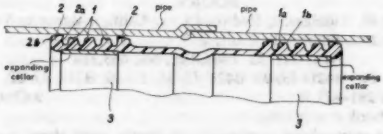
PCT No. PCT/EP85/00011, § 371 Date Oct. 30, 1985, § 102(e) Date Oct. 30, 1985, PCT Pub. No. WO85/03338, PCT Pub. Date Aug. 1, 1985

PCT Filed Jan. 16, 1985, Ser. No. 779,771

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1984, 3402325

Int. Cl.[4] F16L *33/16*

U.S. Cl. 285—109 **10 Claims**



1. A cuff for internally sealing joints defined between adjacent ends of pipes to be joined together, said cuff including an annular body having on each end a plurality of annular ribs extending outwardly therefrom, said annular body and said plurality of annular ribs being formed in one piece from an elastic material, said cuff adapted to be pressed against the inner walls of said pipes by an expanding collar received within

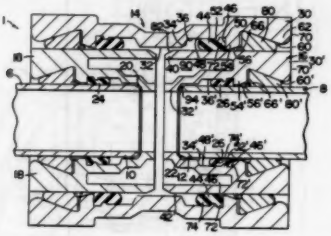
the cuff on its inner side in the region of said annular ribs, said plurality of annular ribs each forming a profile in cross-section having two curvatures oriented towards the walls of said pipe when said annular ribs are in their unloaded state.

4,685,705

LARGE DEFLECTION PIPE COUPLING

Lawrence S. Jones, Hueytown, Ala., assignor to United States Pipe and Foundry Company, Birmingham, Ala.

Filed Jun. 27, 1986, Ser. No. 879,770
Int. Cl.[4] F16L *21/02*
U.S. Cl. 285—177 **8 Claims**



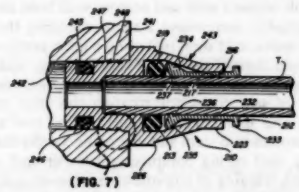
1. A pipe joint comprising a first pipe, a second pipe and a bell stub, said first pipe having a longitudinal portion extending a predetermined distance away form one end of said first pipe, said longitudinal portion having a uniform outer circumference of predetermined diameter, said second pipe having at least one end having an internal bell cavity at one end of said second pipe, said bell stub having a uniform outer circumference of predetermined diameter and at least one end having an internal bell cavity, a portion of said longitudinal portion of said first pipe being enclosed and sealed in said bell cavity of said bell stub and said bell stub being enclosed and sealed in said bell cavity of said second pipe, said longitudinal portion of said first pipe being spaced radially from said bell cavity of said bell stub a sufficient distance to permit angular movement of said longitudinal portion of said first pipe with respect to said bell stub and said bell stub being radially spaced from said bell cavity of said second pipe a sufficient distance to permit angular movement of said bell stub with respect to said bell cavity of said second pipe, whereby said first pipe, said bell stub and second pipe may be offset at an angle with respect to each other.

4,685,706

RELEASABLE PUSH-TO-CONNECT TUBE FITTING

Leonard J. Kowal, Prospect Heights; Albert J. Schwarz, Lincolnwood, and Norman B. Wells, Skokie, all of Ill., assignors to Clevite Industries Inc., Glenview, Ill.

Continuation-in-part of Ser. No. 708,164, Mar. 4, 1985, Pat. No. 4,621,842. This application Dec. 31, 1985, Ser. No. 815,332
The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.
Int. Cl.[4] F16L *21/06*
U.S. Cl. 285—322 **17 Claims**



(FIG. 7)

1. A releasable tube fitting comprising:

a body provided with a through bore, said body having an axially outer portion, said bore defining a cylindrical inner surface at the axially outer end of said bore opening through said body outer portion, and a radial stop surface at the axially inner end of said axially outer portion of the bore;

a split resilient tubular bushing in said axially outer end of the bore resiliently biased against said cylindrical surface, an axially inner end portion

of the bushing defining a radially inner axially inwardly widening frustoconical wedging surface; and

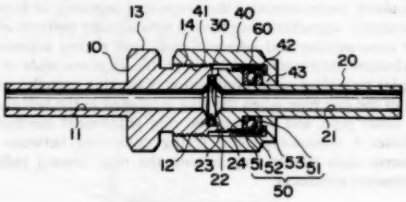
an annular collet for coaxially receiving the end of a tube for connection to said body, said collet defining an axis and being coaxially received in said bushing and having a tubular midportion, an axially outer radially outwardly turned portion axially outwardly of said body outer portion and having an outer diameter greater than the inner diameter of said bushing at the axially outer end thereof for ease of tube release, an axially inner end permitting constriction of said collet inner end radially inwardly of said frustoconical wedging surface of the bushing and having a radially outwardly projecting camming portion, and a radially inwardly directed sharp tube gripping portion, said collet further having at least one longitudinally extending slot at said axially inner end as an incident of the collet being urged axially outwardly with said camming portion engaging said frustoconical wedging surface, the total slot width circumferentially of the collet axis being preselected to cause the minimum outer diameter of said camming portion when said inner end of the collet is fully radially constricted to be greater than the diameter of the axially outer end of said frustoconical wedging surface.

4,685,707

SUPERFINE FINISH PIPING JOINT

Naoya Miyashita, Yokohama, Japan, assignor to Sanko Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 21, 1986, Ser. No. 842,336
Claims priority, application Japan, Sep. 30, 1985, 60-216326
Int. Cl.[4] F16L *25/00*
U.S. Cl. 285—328 **9 Claims**



1. A piping joint, comprising:

a first joint piece having threads thereon, having a first surface thereon which faces in a first direction, and having therein a first passage which opens through said first surface;

a second joint piece having thereon a second surface which faces in a second direction opposite said first direction and faces said first surface on said first joint piece, said second joint piece having therein a second passage which opens through said second surface and having thereon a third surface which faces in said first direction;

a ring which is interposed between said first and second joint pieces and has a central opening therethrough, said first and second surfaces on said joint pieces sealingly engaging said ring on opposite sides thereof, and said first and second passages being in fluid communication with each other through said central opening in said ring;

a box nut rotatable relative to said first and second joint pieces and having threads thereon which engage said threads on said first joint piece, said box nut having

thereon a fourth surface which faces in said second direction and faces said third surface on said second joint piece;

a thrust bearing interposed between said third surface on said second joint piece and said fourth surface on said box nut; and

a retainer member having means for supporting said retainer member on one of said second joint piece and said box nut and which supports said thrust bearing in a predetermined position on said one of said second joint piece and said box nut;

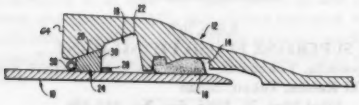
wherein rotation of said box nut relative to said joint pieces in a predetermined direction effects movement of said box nut in said second direction relative to said first joint piece, said box nut effecting movement of said thrust bearing and said second joint piece in said second direction so as to effect movement of said first and second surfaces toward each other and into progressively tighter sealing engagement with the opposite sides of said ring.

4,685,708

AXIALLY RESTRAINED PIPE JOINT WITH IMPROVED LOCKING RING STRUCTURE

Randall C. Conner, and Van T. Walworth, both of Warrior, Ala., assignors to American Cast Iron Pipe Company, Birmingham, Ala.

Filed Mar. 7, 1986, Ser. No. 837,402
Int. Cl.[4] F16L *21/02*
U.S. Cl. 285—374 **19 Claims**



1. An articulated, segmented ring structure for use in an axially restrained pipe joint wherein a spigot end of one pipe fits in a bell end of another pipe, the articulated, segmented ring structure comprising a plurality of ring segments, means articularly interconnecting the respective segments to form an articulated, segmented ring having substantially uniform effective cross-section and adjacent ends, and a ring adjustment mechanism interconnected between the adjacent ends of the ring for providing radial contraction of the ring onto the spigot end of the one pipe when the ring is located in the bell end of the other pipe, and wherein the ring adjustment mechanism includes a tension-type coil spring connected between the adjacent ends of the ring biasing the ring toward radially contracted condition.

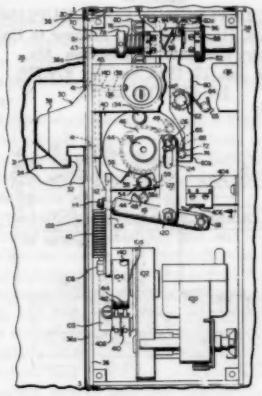
4,685,709

DEADLOCKED LATCH HAVING DISC AND MOTOR ACTUATORS

Raymond V. Kambic, Joliet, Ill., assignor to R. R. Brink Locking Systems, Inc., Plainfield, Ill.

Filed May 29, 1984, Ser. No. 614,982
Int. Cl.[4] E05B *47/00*
U.S. Cl. 292—201 **37 Claims**

1. A lock mechanism including a casing structure adapted to be mounted to one of a door and door frame and having a front plate with an aperture therein; a latch bolt mounted with respect to said casing structure for movement between a first position for latching engagement with the other of said door and door frame, and a second, retracted position wherein said latch bolt is held out of position from said latching engagement; a deadlock member mounted to said casing for movement between a blocking position wherein said deadlock member will prevent movement of the latch bolt to said second, retracted position, and a non-blocking position wherein said latch bolt is free to move to said retracted position; an operating disc comprising a relatively thin, generally circular, generally disc-shaped plate having a center and mounted for rotation about its said center and also operatively coupled to move said latch bolt through a lost motion type of connection; and control means for effecting selective movement of said operating disc to move said latch bolt to the retracted position, with the



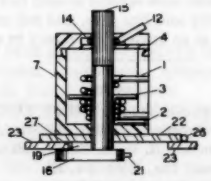
initial rotation of said operating disc resulting in the movement of the deadlock member to the non-blocking position, with said lost motion connection delaying movement of said latch bolt until said deadlock is moved from the blocking position; wherein said latch bolt and said operating disc are coaxially, rotatably mounted.

4,685,710

CLAMPING DEVICE

Azmy W. Ghaly, 2122 24 Ave. S., Minneapolis, Minn. 55406

Filed May 30, 1984, Ser. No. 615,348
Int. Cl.[4] E05C *5/02*
U.S. Cl. 292—67 **4 Claims**



1. A holding device comprising:

a cylindrical housing defined by a closed bottom wall, a circular side wall and an open top, said bottom wall having a hold disposed therein;

a cover for closing the top of said housing, said cover including a hole aligned with said bottom wall hole; an L-shaped latch member comprising a stem extending through said aligned holes, said stem including a latch portion disposed at one end thereof outside of said housing, said stem also including a handle portion at the opposite end thereof outside of said cover for rotating the latch member to latched and unlatched positions; a first coil spring disposed around said stem and extending axially through said housing, said spring comprising a lower end, and upper end and a plurality of convolutions between said ends, said housing including a longitudinal slot within said circular side wall through which said upper and lower ends extend,

said stem including a diametrically disposed hole through which a pin extends, said pin also extending through the

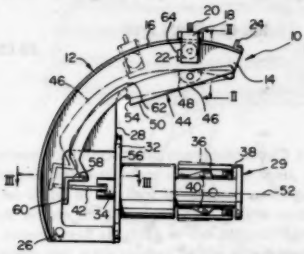
convolutions of the coil spring; whereby, rotation of said housing draws the latch portion towards said housing as successive convolutions of said spring are moved beneath said pin.

4,685,711

LIFTING AND TILTING DEVICE

Bretislav P. Zuber, Montreal, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Mar. 3, 1986, Ser. No. 835,505
Int. Cl.[4] B66C *1/54*
U.S. Cl. 294—86.41 **5 Claims**



1. A lifting and tilting device for lifting and carrying reels of wound material of indefinite length comprising:

a frame having an arcuate track;

a lifting block movable along the track, the block having means for attachment to a flexible lifting member to raise and lower the device;

means for locating and gripping a reel, said means comprising a support shaft extending from the frame for insertion into an axial bore of the reel and expandable gripping elements movable radially of the shaft to frictionally engage or disengage the surface of the axial bore;

the frame and support shaft being tiltable by movement of the track to change the position of the lifting block upon the track when the frame and shaft are suspended from the block; and

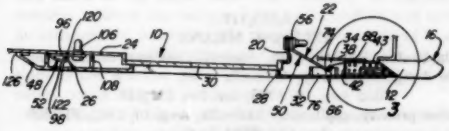
a reel retention means comprising a lever means pivotally connected to the frame, the lever means normally urged into a retention position and being movable out of said position, the lever means having an abutment surface for abutting engagement with one side of a reel flange to prevent removal of the reel from a seating position on the shaft when the lever means is in the retention position.

4,685,712

SPRING MOUNTED MOLDING FOR A VEHICLE

Raymond J. Wachowski, Sterling Heights, and Francis A. Mulso, Lake Orion, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Sep. 25, 1986, Ser. No. 911,545
Int. Cl.[4] B60R *19/42*
U.S. Cl. 293—128 **3 Claims**



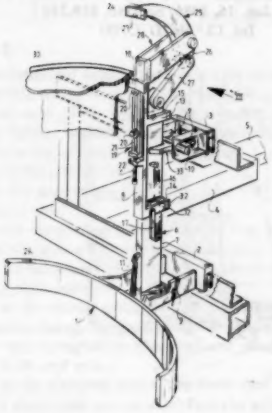
1. In a spring mounted molding for a vehicle having a body and a bumper mounted on one of the forward and rearward ends thereof, energy absorbing structure mounting the bumper to the vehicle, said energy absorbing structure biasing the bumper to a normal position but permitting movement of the bumper towards the vehicle upon impact, said bumper having an end portion extending around a side of the vehicle body, said spring mounted molding comprising a relatively rigid element having an underside and an exterior side, spring means on the underside of the molding, said spring means being connected between the molding and the vehicle with the molding lying on the exterior of the vehicle body in alignment with, and adjacent to, said bumper end portion, said spring means biasing the molding closely adjacent to the vehicle body, the molding having a camming surface adjacent to the bumper end portion, the bumper end portion having a mating camming surface adapted to contact the molding camming surface and move to the underside of the molding when the bumper is moved toward the vehicle upon impact, with said molding moving away from the vehicle body against the action of said spring means, said spring means being effective to bias the molding back to its original position upon retraction of the bumper end portion; said spring means being fixedly anchored to one of the vehicles and molding and slidably anchored to the other of the vehicle and molding, the improvement comprising a spring urged extension member telescopically mounted in the molding adjacent to the bumper end portion, said member including the molding camming surface which is normally urged into contact with the mating bumper camming surface.

4,685,713

CONTAINER GRAB

Herman L. Van der Hulst, Nieuwleusen, and Arend H. Meerman, Dedemsvaart, both of Netherlands, assignors to Indapp Engineering B.V., Netherlands

Filed Nov. 6, 1985, Ser. No. 795,539
Claims priority, application Netherlands, Nov. 9, 1984, 8403444
Int. Cl.[4] B66C *1/66;* B66F *9/18*
U.S. Cl. 294—90 **18 Claims**



1. Container grab comprising co-operating jaws attached to a frame, between which jaws a container rim is to be accommodated, characterized in that the under jaw is attached to a carriage slidable along a frame column comprised in said frame and the upper jaw is attached to one end of a lever pivotally attached to said carriage, the other end of said level being coupled via a link with said frame column.

4,685,714

LIFTING ASSEMBLY

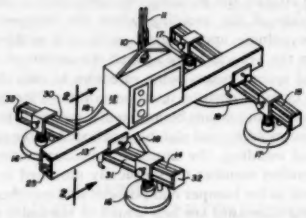
Thomas A. Hoke, R.D. #2, Red Lion, Pa. 17356

Filed Dec. 18, 1986, Ser. No. 943,103
Int. Cl.[4] B66C *1/02*
U.S. Cl. 294—81.2 **5 Claims**

1. A lifting assembly of the type comprising a load beam and

at least one cross arm suspended from the load beam and movable along the longitudinal axis of the load beam, the load beam being hollow and having a top wall and two parallel side walls, each side wall having an inwardly extending flange at the bottom thereof, the flanges defining a bottom wall with a longitudinal slot therein, characterized in that the cross arm is suspended below the load beam by means comprising:

(a) a traversing member positioned within the load beam and above the slot therein;



(b) roller means attached to and extending from each side of the traversing member and in rolling contact with the internal surface of the bottom wall of the load beam on either side of the slot;

(c) support means extending between and secured respectively to the traversing member and cross arm, whereby the cross arm is supported by the support means; and

(d) means for locking the cross arm in position along the longitudinal axis of the load beam.

4,685,715

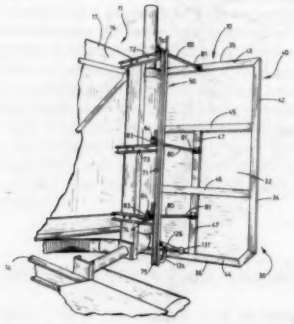
AIR BAFFLE FOR AN OVERLAND VEHICLE

Michael L. Hardin, 4724 Ashbury Dr., Jefferson, La. 70121

Filed Jan. 16, 1986, Ser. No. 819,310

Int. Cl.[4] B62D *35/00*

U.S. Cl. 296—1 S **2 Claims**



1. An adjustable air baffle apparatus for a vehicle comprising:

A. a deflector shield adapted to divert air impinging thereagainst;

B. a mounting frame mounting the deflector shield thereon for movement relative thereto and itself adapted to be mounted on a vehicle in supporting relation to the deflector shield;

C. a brace having a first end portion mounted for substantially pivotal movement on the deflector shield and having a second end portion received for substantially slidable movement on the mounting frame; and

D. a locking assembly borne by the mounting frame including a shaft movable along a path of travel off set relative to the brace and a locking pin mounted on the shaft and off set relative to the shaft for movement with the shaft into engagement with the brace to lock said brace relative to the mounting frame, whereby the deflector shield is retained in a selected position, and for movement with said shaft from engagement with the brace to allow said slidable movement of the brace for repositioning of the deflector shield.

4,685,716

SEAT MOUNTING ARRANGEMENT

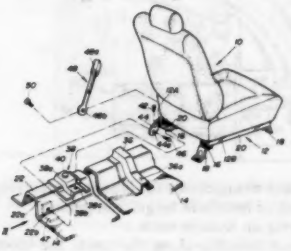
Nobuaki Kondo, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Japan

Filed Nov. 4, 1985, Ser. No. 794,442

Claims priority, application Japan, Dec. 12, 1984, 59-187378[U]

Int. Cl.[4] B60N *1/08*

U.S. Cl. 296—63 **10 Claims**



1. In a motor vehicle having a passenger seat on a vehicle floor with a floor tunnel at its inboard side, said seat being incorporated with a safety seat belt assembly,

a seat mounting arrangement comprising:

a seat sliding mechanism including first and second assemblies, each assembly including a stationary rail connected to the vehicle floor and a slide rail secured to said seat and slidable on said stationary rail, so that said seat is slidable relative to said vehicle floor, said first assembly being located adjacent said vehicle floor tunnel;

first and second brackets secured to longitudinally spaced portions of the stationary rail of said first assembly and connected to said vehicle floor;

third and fourth brackets secured to longitudinally spaced portions of the stationary rail of said second assembly and connected to said vehicle floor,

wherein at least one of said first and second brackets comprise a toughly constructed support member which transversely straddles said floor tunnel and is bolted to the same, said support member comprising a raised center portion bolted to said floor tunnel and two wing portions at opposite longitudinal ends of said support member extending in opposite directions from said center portion, one of said wing portions supporting thereon the associated stationary rail and secured to the same.

4,685,717

AFFIXING MEANS

Ronald Gaston, Banksia Park, Australia, assignor to Kim Garfield Aunger, Netherby, Australia

Filed Aug. 10, 1983, Ser. No. 521,823

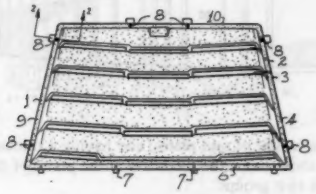
Claims priority, application Australia, Aug. 10, 1982, PF5309

Int. Cl.[4] B60J *3/00*

U.S. Cl. 296—97 A **4 Claims**

1. Attachment means for securing a louvre unit comprised of an integrally molded plastic material to the external face of a rear window assembly of a motor vehicle, the window assembly being of the kind which includes a glass portion and a resilient surround for the glass portion, said attachment means

comprising an attachment member including a lip portion and a support portion, the lip portion adapted to engage between and be held by the resilient surround of the rear window assembly, and the external face of the glass portion, a lowermost face of the support portion adapted to be secured by adhesion to the external face of the glass portion, the location and shape of said lip portion and said support portion being such as to co-operatively assist in affixing the attachment member to the rear window assembly, the support portion further including



an aperture for interlocking engagement of a releasable member, the releasable member including a head, a shank, and a foot, the shape of the foot being such as to pass through an aperture within the perimeter of a louvre unit and co-operatively engage said aperture in the support portion to secure said louvre unit with respect to the attachment member, the releasable member including outwardly extending portions adapted to engage with resilient resistance the sides of an aperture within the perimeter of the louvre unit.

4,685,718

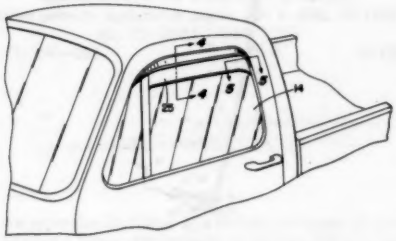
DEVICE FOR ATTACHING RAIN SHIELDS TO MOTOR VEHICLE WINDOWS

Richard A. Steenblik, Stone Mountain; Asa R. Phillips, Dunwoody; Daniel P. Mamay, Lilburn; Lawrence K. Denson; Richard A. Tucker, both of Smyrna, and Jimmy M. Clark, Lawrenceville, all of Ga., assignors to Liberty Specialties, Inc., Chamblee, Ga.

Continuation of Ser. No. 871,757, Jun. 9, 1986, abandoned. This application Jan. 21, 1987, Ser. No. 8,047

Int. Cl.[4] B60J *9/00*

U.S. Cl. 296—154 **26 Claims**



1. Retainer means for holding the top edge of a removable rain shield in the upper horizontal casing of an automobile window, wherein the casing is lined with a resilient seal which, in cross-section, is substantially shaped like an inverted U with inwardly upturned, flexible feet that seal against the opposite sides of the window glass when the window is closed, said means comprising the combination of

(a) a length of substantially U-shaped channel member having a ceiling, an inside wall ending in a bottom edge, and an opposite, outside wall also ending in a bottom edge; said channel member being of a size to be insertable, ceiling-first, in said casing, so that the channel member's bottom edges are tucked behind the respective upturned feet of the seal, thereby holding the channel member from falling out of the window casing; the outside wall of the channel member having at least one longitudinal ledge section on its interior surface; and

(b) a substantially U-shaped clip having a ceiling, an inside wall ending in a bottom edge, and an opposite, outside wall also ending in a bottom edge; said clip being of a size to be insertable, ceiling-first, in said channel member; the bottom edge of the clip's outside wall being bent outwardly and upwardly so as to be capable of gripping the top edge of the rain shield between said outside wall and the adjacent upturned foot of the resilient seal; said clip's outside wall having an outwardly projecting barb member adapted to hook over the interior ledge section on the channel member's outside wall, thereby preventing the clip from falling out of the window casing.

4,685,719

CONVERTIBLE SITTING-SLEEPING ARRANGEMENT FOR RECREATIONAL VEHICLE

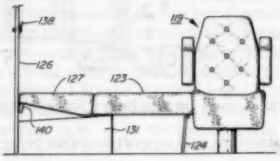
Jacobus N. Hanemaayer, Kitchener, Canada, assignor to Hanmar Home Equipment Limited, Ontario, Canada

Continuation-in-part of Ser. No. 409,549, Aug. 19, 1982, Pat. No. 4,550,946, which is a continuation-in-part of Ser. No. 348,695, Feb. 16, 1982, abandoned. This application Oct. 28, 1985, Ser. No. 792,209

Claims priority, application Canada, May 26, 1982, 403776

Int. Cl.[4] B60P *3/38*; **B60R** *1/10*; **A47C** *17/16*

U.S. Cl. 296—156 **10 Claims**



1. A recreational vehicle having in a forward section thereof a convertible sitting-sleeping area comprising a front seat and a rear seat, each of the seats having a seating portion, and said rear seat further including a movable backrest; the front and rear seats being adapted to assume either a sitting mode or a sleeping mode and including:

means for supporting the front seat for rotation about a vertical axis;

means for supporting the rear seat so that its seating portion is movable in a front-to-back direction;

means for releasably retaining the backrest of the rear seat in an upright position;

when in the sitting mode the front seat having a rotational position facing forwardly of the vehicle body with the rear seat being situated behind and suitably spaced from the front seat and,

when in the sleeping mode, the front seat having been rotated about said axis so as to face the adjacent side of the vehicle with the rear seat having been moved forward on its supporting means so that the seating portion thereof is adjacent the seating portion of the front seat, and said movable backrest having been released from the upright position and being located horizontally immediately behind the seating portion of the rear seat so that the seating portion of the rear seat is located intermediate said movable backrest and the seating portion of the front seat such that both of said seating portions and said backrest lie in generally co-planar relation to one another to form a bed extending within the sitting-sleeping area,

and wherein a spacer-support is associated with said backrest, said spacer-support being movable from

(A) a first position in the sitting mode wherein a first edge of said spacer-support, which edge becomes separated from said backrest on release of the backrest from the upright

position, abuts against a lower portion of the backrest when upright to maintain the backrest at a selected angle of incline, to

(B) a second position in the sleeping mode wherein a second opposite edge of said spacer-support abuts against and supports that end of the backrest which is remote from the seating portion of the rear seat when in said generally horizontal position.

4,685,720

SEMITRAILER AND METHOD OF LOADING THE SAME

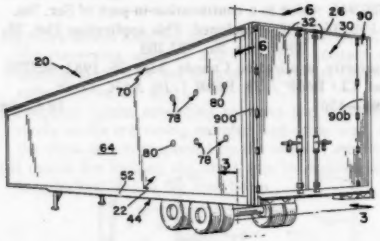
Donald G. Oren, 3105 Sandy Hook Dr., St. Paul, Minn. 55113, and David D. Oren, 1270 Payne Ave., St. Paul, Minn. 55101

Continuation of Ser. No. 529,107, Sep. 2, 1983, Pat. No. 4,592,585. This application Mar. 21, 1986, Ser. No. 842,310

The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.

Int. Cl.[4] B62D *33/04*

U.S. Cl. 296—181 **17 Claims**



12. A semitrailer used on roadways for hauling articles, comprising:

(a) a support structure, said support structure being mounted on wheels;

(b) two sidewalls, a front end wall, a top wall, and a back end to form an enclosure at ambient atmospheric temperature, said back end including door means providing for access to the inside of the semitrailer; and

(c) a floor portion having a top and bottom surface supported by said support structure, the top surface of said floor portion being raised generally along a majority of its longitudinal extent, whereby when the articles are loaded into the semitrailer so as to form two rows extending longituidinally of the semitrailer, the articles are tilted outward toward the sidewalls of the semi-trailer, the semitrailer havng an inside width of more than 100 inches to accomodate pallets of forth-four (44) inches by fifty-six (56) inches.

4,685,721

PLATE TRAILER

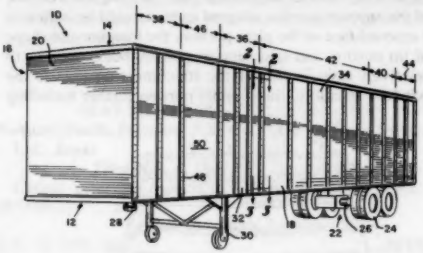
Tara N. Banerjea, Monticello, Ind., assignor to Monon Corporation, Monon, Ind.

Filed Jun. 9, 1986, Ser. No. 872,040

Int. Cl.[4] B62D *33/04*

U.S. Cl. 296—181 **23 Claims**

1. A trailer body construction comprising a floor, a roof, and a pair of sidewalls, each sidewall comprising at least two groups of generally flat, rectilinear plates of lightweight metallic material of a predetermined width and height aligned in side by side relation, the plates of each group having a uniform thickness, the plates of a first of the at least two groups being appreciably thicker than the plates of the second of the at least two groups, the groups of plates being selectively arranged in each sidewall so as to achieve enhanced strength at selected regions of maximum deformation induced stress, and a plurality of joining panels of metallic material situated on only the exterior surface of each sidewall for joining and strengthening respective adjacent pairs of plates, the joining panels each consisting essentially of a narrow rectilinear strip of aluminum alloy having a width equal to a minor fractional portion of the width of said plates, having a height equal to a major fractional



portion of the height of said plates, and having a thickness no greater than about twice the thickness of the plates of the first of the at least two groups.

4,685,722

DOOR FOR A MOTOR VEHICLE

Rainer Srock, Leonberg, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 16, 1986, Ser. No. 819,341

Claims priority, application Fed. Rep. of Germany, Jan. 16, 1985, 3501239

Int. Cl.[4] B60J *5/04*; B60R *13/04, 19/42*

U.S. Cl. 296—188 **9 Claims**

1. A door for a motor vehicle, comprising an upper outer part provided with a window cutout, a lower outer part connected with the upper outer part, at least one safety reinforcing means arranged within the door, said reinforcing means extending in the vehicle longitudinal direction and constructed as hollow bearer means, the lower outer part of the door being a one-piece unitary lower outer part which includes a shell-shaped door outer element with an integrated hollow bearer means;

wherein the door outer element includes a cover means of plastic material at its outer surface; and

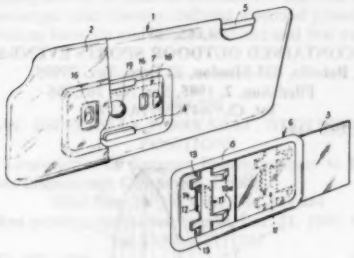
wherein the hollow bearer means has a circularly shaped cross section which is adjoined approximately in a vertical longitudinal center plane by the shell-shaped door outer element.

4,685,723

SUN VISOR FOR A MOTOR VEHICLE

Jean C. Canadas, Remiremont, France, assignor to Compagnie Industrielle de Mecanismes en abrege C.I.M., France

Filed Mar. 25, 1986, Ser. No. 843,527
Claims priority, application France, Mar. 25, 1985, 85 04427
Int. Cl.[4] B60J 3/00
U.S. Cl. 296—97 H 8 Claims



1. In a sun visor fitted with a mirror for a motor vehicle that improvement consisting of

a shield having a cavity;

a covering of plastic material covering said shield;

a mirror slidably mounted in the cavity of said shield; and

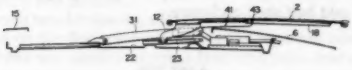
means for fixing the mirror in the cavity comprising a detachable support having a reinforcement whose periphery matches the contour of the mirror on which the mirror is slidably mounted and on which the mirror can be fixed in said cavity, retaining means defining at least one opening, tabs on said reinforcement which are capable of engaging in the retaining means to elastically clip thereon by hooking on the edges of said opening in the retaining means.

4,685,724

SLIDING ROOF FOR VEHICLES

Toshiaki Niwa, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 510,336, Jul. 1, 1983, abandoned. This application Feb. 10, 1986, Ser. No. 827,875
Claims priority, application Japan, Jul. 2, 1982, 57-115271
Int. Cl.[4] B60J 7/047, 7/057
U.S. Cl. 296—216 18 Claims



1. An apparatus for tilting up a sliding roof panel (2) about a rear edge of a frame (22) defining an opening (4) in a vehicle roof (6, 15) and for moving said sliding roof panel (2) rearwardly above the roof, comprising:

guide means, including main guides (23) and sub-guides (31), arranged on both sides of said opening; and

stay means, including front stays (12) and rear stays (41), provided on said sliding roof panel (2);

said front stays (12) being fixed on both sides of said panel (2) and operatively connected to said main guides (23);

said rear stays (41) being slidably connected to said sliding roof panel (2) and operatively connected to said sub-guides (31);

said sub-guides (31) being located adjacent said main guides (23); and

said front stays (12) are arranged to be located transversely adjacent said rear stays (41) when the sliding roof panel (2) has been moved completely rearwardly.

4,685,725

SEATING APPARATUS

Robert H. Helfrich, 1411 Merced St., Richmond, Calif. 94804

Filed May 14, 1985, Ser. No. 734,178
Int. Cl.[4] A47C 4/28
U.S. Cl. 297—45 19 Claims

1. A foldable chair, which comprises,

(A) a frame assembly, which has,

(a) a plurality of substantially vertical sides, which includes

(a1) two lateral sides, each of which further includes,

(a1.1) first, second and third elongate brace members, wherein one end of the first brace member is pivotally connected to the substantially horizontal second brace member (5,6), the third brace member and the first brace member cross intermediae the ends of both members (1,3), and the third brace member is pivotally connected, intermediate its ends, to the first brace member (1,3), or to the second brace member at a point on the second brace member further from a first end of the second brace member (13,12) than from the pivotal connection of the first and second brace members (5,6), and

(a1.2) a positional relationship of its brace members, wherein the first and third brace member crossing (1,3), is closer to the other end of the first brace member (16,15), than is a crossing of the third brace member with a longitudinal axis of the second brace member (7,8), and

(a2) a third side, which further includes,

(a2.1) two elongate brace members, the brace members cross and are pivotally connected to each other intermediate their ends (2), and

(a2.2) a plurality of interconnections to the lateral sides, wherein one end of each third side brace member is pivotally interconnected with one end of an opposite lateral side third brace member (17,14), and the other end of each third side brade member is pivotally interconnected with the first end of an opposite lateral side second brade member (13,12), and

(b) a plurality of configurations with respect to the ground, which includes,

(b1) an arm chair configuration, wherein one end of each pivotally interconnected lateral side third brace member and one end of each third side brade member (17,14), together with the other end of each lateral side first brace members (16,15), form ground engaging supports for the frame assembly, and each said lateral side third brade member alternative pivotal connection intermediate its ends is to the lateral side first brace member (1,3), or

(b2) a straddle chair configuration, wherein one end of each pivotally interconnected lateral side second brace member and the other end of each third side brace member (13,12), together with the other end of each lateral side third brace member (10,11), form ground

engaging supports for the frame assembly, and each lateral side third brade member alternative pivotal connection intermediate its ends is to the lateral side second brace member (7,8); and

(B) a sling seat supported in suspended relationship on the frame assembly.

4,685,726

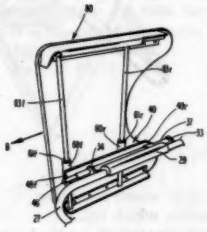
MODIFIED GERIATRIC CHAIR

George H. Wolpert, Jr., Columbia, Pa., assignor to McKesson Corporation, San Francisco, Calif.

Filed Feb. 29, 1984, Ser. No. 584,643

Int. Cl.[4] A47C 7/02

U.S. Cl. 297—150 **8 Claims**



1. An improved adjustable tray table for use in combination with a frame member and designed for ease of movement from a storage position to a service position, comprising:

adjustment means in communication with said frame member for permitting slidable movement along and rotatable movement about said frame member, said adjustment means further including first tube means affixed with said frame member, second tube means engaging said first tube means for coaxial movement within said first tube means and cuff means coaxially associated with and for movement around said first tube means; and

holster means operatively engaged with said second tube means and said cuff means, said holder means further providing a slidable engagement with said tray table;

whereby said adjustable tray table may be slidably moved relative to said holster means, may be slidably moved relative to said frame member and may be rotated together with said holster means about said frame member into said service position.

4,685,727

VEHICLE SEAT

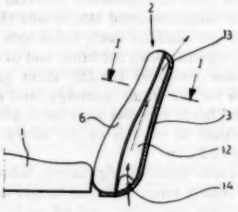
Heinz P. Cremer, Kaiserslautern; Werner Wittig, Winnweiler, and Hans W. Voss, Rockenhausen, all of Fed. Rep. of Germany, assignors to Keiper Recaro GmbH & Co., Fed. Rep. of Germany

Filed Mar. 26, 1986, Ser. No. 844,380

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1985, 3511217

Int. Cl.[4] A47C 7/72

U.S. Cl. 297—180 **23 Claims**



1. A vehicle seat having a back rest and support surface for supporting the vehicle user, in which at least one portion of the support surface facing the seat user forms at least the outside of a wall, the inner side of which wall borders at least one channel, through which air flows, wherein said wall is at least substantially impermeable to air at the pressure prevailing in the channel, and said wall comprises a material which, when there is a drop in the water vapor partial pressure from the outside to the air flowing through the channel, transfers water vapor in the direction of this partial pressure drop.

4,685,728

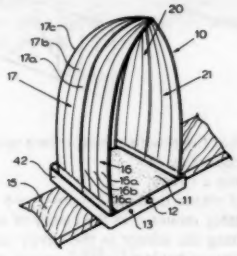
SELF-CONTAINED OUTDOOR SPORTS EVENT SEAT

Juan G. Rebollo, 633 Mission, El Paso, Tex. 79905

Filed Aug. 2, 1985, Ser. No. 761,756

Int. Cl.[4] A47C 1/16, 7/66

U.S. Cl. 297—184 **7 Claims**



1. A portable, inflatable stadium type seat comprising:

a rigid hollow base including spaced apart walls defining an air tight air reservoir,

inlet means connected to said hollow base for introducing pressurized air into said air reservoir,

a plurality of double-walled panels secured to said base and comprising tapered end portions, said panels upon assembly providing a half shell enclosure including a canopy of reduced cross-sectional area at its upper end,

fastening means for releasably securing said double-walled panels into said half shell enclosure,

a pressure manifold communicating with said air reservoir, and

a plurality of conduits extending from said manifold and arranged to introduce pressurized air from said pressure manifold into the individual double-walled panels to inflate the same, said panels when inflated providing the sole mechanical support for supporting the panels in the form of said half shell enclosure.

4,685,729

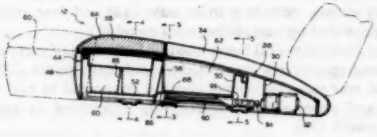
RETRACTABLE CONSOLE FOR AN AUTOMOTIVE VEHICLE SEAT

Max O. Heesch, Brooklyn, Mich., and Vincent Russo, Cary, N.C., assignors to ITT Corporation, New York, N.Y.

Filed Sep. 18, 1986, Ser. No. 908,622

Int. Cl.[4] A47C 7/62

U.S. Cl. 297—193 **11 Claims**



1. A combination console and second passenger seat bottom for an automotive vehicle comprising:

first frame means adapted to be mounted between a drivers

seat and a first passenger seat for movement with at least a one of said drivers seat and said first passenger seat;

second frame means mounted for selective movement between a fully retracted position in abutment with said first frame means and a fully extended position disposed spaced apart from said first frame means defining a console in the extended position, said first frame means and said second frame means defining a substantially continuous external surface configuration in said fully retracted position complimentary to and contiguous with the external surface configuration of each of said drivers seat and said first passenger seat, thereby defining a second passenger seat bottom between said drivers seat and said first passengers seat.

4,685,730

SEAT, ESPECIALLY WORK SEAT, WITH SEVERAL POSITIONS

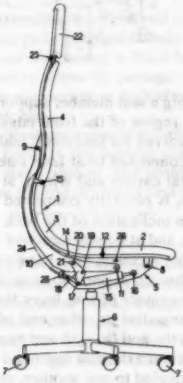
Louis Linguanotto, La Garenne, France, assignor to Etablissements Linguanotto, Courbevoie, France

Filed Dec. 20, 1985, Ser. No. 811,264

Claims priority, application France, Dec. 21, 1984, 84 19724

Int. Cl.[4] A47C *1/032*

U.S. Cl. 297—316 **9 Claims**



1. Seat, especially work seat, comprising

a frame mounted vertically adjustable on a support base and carrying a body-supporting structure including a substantially flat front seat portion, a curved rear seat portion and a back rest portion,

a curved bracket having a lower front end and an upper rear end on the frame for supporting the back rest portion,

the front seat portion having a front end and a rear end and being pivoted near its front end by a first horizontal transverse axis to the frame near the front end thereof and at its rear end by a second horizontal transverse axis to the front end of the rear seat portion,

the bracket being pivoted at its lower front end by a third horizontal transverse axis to the frame, in front of said second axis,

a positioning means provided having one portion attached to the bracket between the two ends of the bracket another portion attached to and the frame for maintaining the bracket in several positions with respect to the frame around the said third axis,

the back rest portion having an upper end and a lower end and being pivoted between the said two ends by a fourth horizontal transverse axis to the upper rear end of the bracket and at its lower end by a fifth horizontal transverse axis to the rear upper end of the rear seat portion, and

the rear seat portion being flexibly connected, between the said second and the fifth axes, by a non-rigid connection to the bracket so that the body supporting structure can be brought into a forward position in which the front end of the rear seat portion and the front seat portion are slightly inclined forwards and downwards relative to the horizontal, and into a draw-back position in which the front end of the rear seat portion and the front seat portion are inclined rearwards and downwards relative to the horizontal.

4,685,731

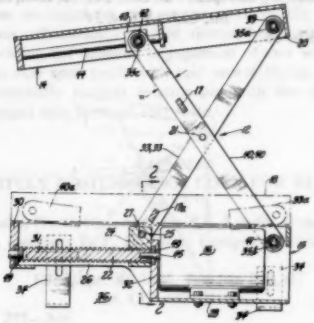
TANK CREW SEAT STRUCTURE

Gary J. Migut, 2652 W. Walton Blvd., Pontiac, Mich. 48055

Filed Oct. 28, 1985, Ser. No. 791,966

Int. Cl.[4] A47C *3/20*; A47B *9/00*; F16M *11/24*

U.S. Cl. 297—347 **3 Claims**



1. A vertically adjustable seat structure comprising a base (**15**) and a seat platform (**14**) located directly above the base; said base having a front end wall area (**30**) and an intermediate wall area (**32**); first thrust bearing means (**49**) carried by the front end wall area, and second thrust bearing means (**49**) carried by the intermediate wall area; a horizontal screw (**22**) having its ends supported in the aforementioned bearing means so that axial thrust forces on the screw are borne by the bearing means; said horizontal screw being located midway between side areas (**26**) of the base to define a central front-to-rear axis for the seat structure; an electrical motor (**16**) mounted on the base behind the intermediate wall area so that its drive shaft (**45**) is in axial alignment with the screw; said drive shaft having a torque-transmitting connection (**46**) with the screw that enables the shaft to turn the screw while preventing the screw from exerting axial force on the shaft; a nut (**24**) encircling the screw for motion therealong; stationary guide rods (**31**) located on the base near side areas (**26**) of the base; a guide block (**29**) slidable on each guide rod for horizontal movement parallel to the screw axis; transverse shaft means (**27**) extending between the nut and each guide block, whereby the nut, shaft means and guide blocks form a unitary structure; a sleeve (**35**) encircling each said transverse shaft means (**27**) in the space between the nut and each guide block, each sleeve having a length substantially the same as the space between the nut and respective guide block, each sleeve having a bearing collar (**23**) at its opposite ends encircling the associated shaft means (**27**) whereby each sleeve has two widely spaced support points on the shaft means; a first pair of links (**33**) occupying vertical planes near side areas of the base; each link (**33**) having one end thereof affixed to one of the above-mentioned sleeves near an outboard end of the sleeve, whereby the two links (**33**) can swing in unison around the transverse shaft means; the other end of each swingable link (**33**) having a first fixed pivot connection (**35*a***) with a rear end area of the aforementioned seat platform; a second pair of swingable links (**40**) occupying vertical planes near side areas (**26**) of the base; each said second link (**40**) having a second fixed pivot connection (**34*b***) with a

rear end area of the base; each said second link having a slidable pivot connection (35c, 43) with the seat platform at a point thereon substantially directly above the aforementioned transverse shaft means (27); and third pivot connections (21) between the first and second links at intermediate points thereon, whereby the links form a lazy tong structure for raising or lowering the seat platform when the electrical motor is energized to rotate the screw.

4,685,732

FOLDING CHAIR

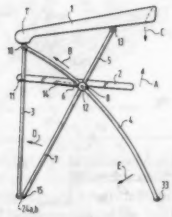
Manfred Kapp; Ulrike Gattermeyer-Kapp, both of Munich, and Alexander Harty, Untersiemau, all of Fed. Rep. of Germany, assignors to Loga Mobel GmbH, Fed. Rep. of Germany

Filed Jan. 8, 1987, Ser. No. 1,468

Claims priority, application Fed. Rep. of Germany, Jan. 13, 1986, 8600622[U]; European Pat. Off., Oct. 23, 1986, 86114650.4

Int. Cl.[4] A47C *4/24*

U.S. Cl. 297—35 **10 Claims**



1. A folding chair disposable between an extended position for use and a collapsed position for transport or storage comprising:

(a) a U-shaped rest including a pair of front ends, a seat narrower than the rest and having a corresponding U-shaped configuration and a front edge, a pair of front legs, and a pair of rear legs exceeding the front legs in length;

(b) the front legs extending vertically and the rear legs extending downwardly and rearwardly when the chair is disposed in the extended position;

(c) the front legs and rear legs being connected to each other at two pairs of corresponding ends and to the front ends of the rest pivotal movement about a first transverse axis;

(d) a slider carried by each rear leg for sliding movement therealong;

(e) first, second, and third struts having three corresponding ends connected to each slider for pivotal movement about a second transverse axis;

(f) the other end of each first strut being connected to the rest for pivotal movement about a third transverse axis, the other end of each second strut being connected to the seat for pivotal movement about a fourth transverse axis, and the other end of each third strut being connected to a front leg for pivotal movement about a fifth transverse axis;

(g) the front edge of the seat being connected to the front legs for pivotal movement about a sixth transverse axis; and

(h) all first and third struts being disposed in a common plane when the chair is disposed in the extended position;

(i) whereby during folding of the chair into the collapsed position, the pair of sliders move along the rear legs toward the first transverse axis when the seat is pivoted about the sixth transverse axis, thereby causing the rest to pivot downwardly, the rear legs to pivot toward the front legs, and the first, second and third pairs of struts to engage against the rest, the seat and the front legs, respectively.

4,685,733

CHAIR

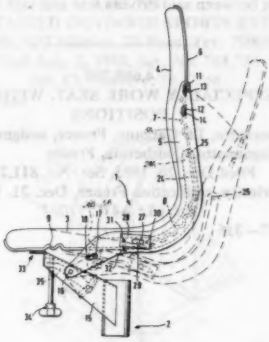
Rainer Machate, Biebertal; Robert Vonhausen, Giessen, both of Fed. Rep. of Germany, and Eckhard Hansen, St. Margrethen, Switzerland, assignors to Voko Franz Vogt & Co., Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 865,325

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518567; Sep. 27, 1985, 3534496

Int. Cl.[4] A47C *3/00*

U.S. Cl. 297—284 **19 Claims**



1. A chair having a seat member supported pivotally about a swivel point in a region of the front edge of said seat member relative to a seat carrier for said chair, said chair further having a back member connected to at least one lever pivotally supported on said seat carrier and which, at a point spaced from said swivel point, is pivotally connected to said seat member such that upon an inclination of the back member there simultaneously occurs, and at a predetermined relationship, an inclination of the seat member, the improvement comprising a control member hinged at one end to said back member below the point of engagement of said lever therewith, said control member being hinged at its other end of one of (a) said seat carrier at a first axle, and (b) said seat member at said first axle spaced from a second axle, said lever and said control member being hingedly coupled to one another, and further including a connecting element at one of (a) said first axle between said control member and said seat carrier, (b) said second axle between said control member and said seat member, and (c) at the hinged coupling between said control member and said lever, to facilitate a relative movement between said control member and said lever at said hinged coupling point or between said control member and its connecting point to said seat carrier or to said seat member.

4,685,734

ENVELOPE FOR HOUSING AND FIXING AN ADJUSTMENT ROD ADJUSTING THE POSITION OF A MOTORCAR SEAT

Luigi Brandoli, Cascine Vica-Rivoli, Italy, assignor to ELCAT Direzione Sviluppo S.p.A., Turin, Italy

Filed Nov. 20, 1985, Ser. No. 800,045

Claims priority, application Italy, Nov. 23, 1984, 54074[U]

Int. Cl.[4] A47C *1/027*

U.S. Cl. 297—355 **9 Claims**

1. An envelope for a rod device for locking the position of a motorcar seat, said envelope comprising:

(a) a first generally cylindrical half shell comprising:

(i) a first body sized and shaped to envelope one side of a rod device for locking the position of a motorcar seat, said first body extending parallel to the axis of the rod device;

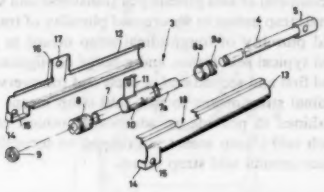
(ii) a bent end extending from one end of said first body at

least substantially perpendicularly to the axis of the rod device and containing a first hole sized, shaped, and positioned to allow the passage of a locking member which, in use, serves to lock the rod device to the motorcar seat; and

(iii) a tang extending from the central portion of said first body at least substantially perpendicularly to the axis of the rod device and containing a second hole sized, shaped, and positioned to allow the locking of a control cable to a control tab on the rod device, and

(b) a second generally cylindrical half shell comprising:

(i) a second body sized and shaped to envelope the other



side of the rod device and to mate with said first body, said second body extending parallel to the axis of the rod device;

(ii) a bent end extending from one end of said second body at least substantially perpendicularly to the axis of the rod device and containing a third hole sized, shaped, and positioned to allow the passage of a locking member which, in use, serves to lock the rod device to the motorcar seat; and

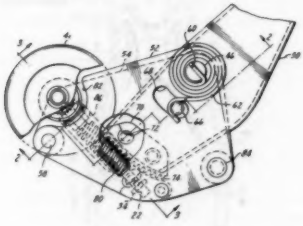
(iii) a cavity extending circumferentially from an edge of said second body at the central portion thereof, said cavity being sized, shaped, and positioned to allow the control tab on the rod device to protrude therethrough.

4,685,735

TILT WORM RECLINER

Bob L. McFalls, Roseville; Timothy S. Myers, Warren, and Chester Fudala, Troy, all of Mich., assignors to Ferro Manufacturing Corporation, Southfield, Mich.

Filed Mar. 18, 1985, Ser. No. 712,690
Int. Cl.[4] B60N 1/02
U.S. Cl. 297—362 **4 Claims**



1. A recliner for an automotive vehicle seat construction comprising:

a seat mount,

an adjustable seat back bracket for supporting a seat back,

a pivot connection between said mount and said bracket to provide for adjustment of said seat back between forwardly and rearwardly inclined positions, said seat back bracket being elongated and in the form of a generally flat plate with a sector at one end having an arcuate series of straight spur teeth occupying a plane perpendicular to the axis of said pivot connection and concentic with the axis of said pivot connection,

an integral housing structure having a base portion with first and second bosses projecting laterally from said base portion, said first boss defining a first journal and having a projecting post, and said second boss defining a second journal, said housing further supporting said pivot connection,

a shaft having first and second ends supported by said first and second journals, respectively,

helical worm means on said shaft having a thread of a predetermined helix angle,

first bevel gear means on said shaft adjacent said first end of said shaft,

second bevel gear means meshing with said first bevel means gear,

a knob journalled for rotation on said projecting post and coupled to said second bevel gear means to enable rotation of said second bevel gear means,

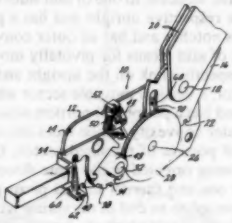
said first and second journals being positioned to locate the axis of rotation of said shaft at a position inclined to the plane occupied by said sector teeth to tilt said worm means substantially at said thread helix angle thereby providing for meshing engagement of said worm thread with said spur teeth with said worm thread being in a substantially tangent relationship with the sides of the engaged spur teeth of said sector.

4,685,736

INFINITELY POSITIONABLE LOCK FOR RECLINING SEAT

Aki Tanaka, Northridge, and David E. Landis, Oxnard, both of Calif., assignors to P. L. Porter Company, Woodland Hills, Calif.

Filed Apr. 30, 1986, Ser. No. 857,337
Int. Cl.[4] A47C 1/00
U.S. Cl. 297—366 **7 Claims**



1. An infinitely positionable backrest lock for a recliner seat comprising:

lower frame means attacheable to a stationary portion of the recliner seat;

an upper plate pivoted to said lower frame and attacheable to the movable backrest of the recliner seat;

a toothed drum wheel rotatably mounted to said lower frame means;

gear means drivingly connecting said upper plate to said drum wheel such that pivotal movement of said upper plate is translated into rotary motion of said drum wheel;

brake spring means wound about said drum wheel and having a normal coil diameter less than the diameter of said drum wheel, said brake spring being secured to said lower frame means so as to normally lock said drum wheel against rotation;

clamping means normally operative for further tightening said brake spring about said drum wheel;

back-up locking means normally spring driven towards interlocking engagement with the teeth on said drum wheel for arresting said drum wheel against rotation in the event of slippage of said brake spring; and

release means actuatable for releasing both said brake spring and said back-up locking means from engagement with

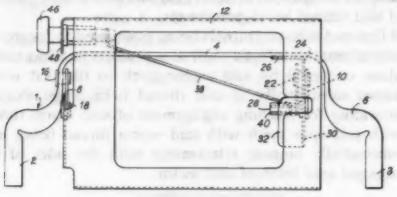
said drum wheel thereby to free said drum wheel for rotation and said upper plate for pivotal movement.

4,685,737

ADJUSTABLE HEADREST FOR A MOTOR VEHICLE SEAT STRUCTURE OR THE LIKE

Serge Deley, Seloncourt, and Francois Fourrey, Montbeliard, both of France, assignors to Cycles Peugeot, Valentigney, France

Filed Oct. 31, 1986, Ser. No. 925,576
Claims priority, application France, May 22, 1986, 86 07287
Int. Cl.[4] A47C *1/10*
U.S. Cl. 297—408 **8 Claims**



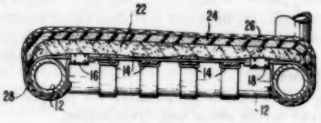
1. An adjustable headrest unit for a seat structure having a backrest, the headrest unit comprising a rigid framework for supporting a padding cushion, lateral uprights adjacent to opposite sides of the framework for fixing the headrest unit to the backrest, links on said opposite sides of the framework for connecting the framework to the respective uprights, means for pivotally mounting a first end of the links on the framework, and means for pivotally mounting second ends of the links opposed to said first ends on the uprights, a fixed sector which is located adjacent to one of said sides of the framework, is fixed to the respective upright and has a peripheral portion which defines notches and has an outer convexity, a pivot pin which is part of said means for pivotally mounting the second end of the respective link on the upright and extends through the fixed sector, a vertical movable sector which is fixed to the framework and has a peripheral portion which defines notches and has an outer convexity which faces the outer convexity of the peripheral portion of the fixed sector, the notches of the two sectors being oriented in the same direction, and a spring wire fixed at one end thereof to said pivot pin, and a control element connected to an end of the spring wire opposed to said end thereof fixed to said pivot pin for controlling the displacement of said wire between a locking position of the spring wire engaged in said notches of the two sectors which face said spring wire and a position disengaged from said notches for releasing the movable sector from said fixed sector.

4,685,738

SEAT REBUILDING

Edward J. Tinus, 511 Pierce St., Baltimore, Md. 21201

Filed Aug. 28, 1985, Ser. No. 770,264
Int. Cl.[4] A47C *7/02*
U.S. Cl. 297—452 **6 Claims**



2. A rebuilt seat means, comprising:

a plurality of transverse strap means having a cushion, each said transverse strap means of said plurality of transverse strap means having a first end and a second end, said first and second ends of said plurality of transverse strap means being suitably looped around a portion of a typical seat frame;

a plurality of longitudinal strap means, each said longitudinal strap means of said plurality of longitudinal strap means having a first end and a second end, said first and second ends of said plurality of longitudinal strap means being suitably looped around a portion of said typical seat frame, said plurality of longitudinal strap means being formed and set into a woven pattern with said plurality of transverse strap means;

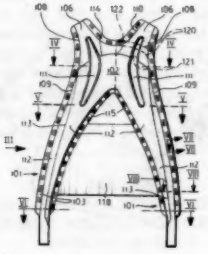
a plurality of clamp means, said plurality of clamp means being located at and upon each said first end and each said second end of said plurality of transverse and said longitudinal strap means to secure said plurality of transverse and said plurality of longitudinal strap means in place upon said typical seat frame, and a bulge configuration in each said first and second end of each said transverse and longitudinal strap means so that said strap means permit said cushions to provide an additional cushion effect before each said clamp means is crimped to securely affix it in place around said strap means.

4,685,739

UPHOLSTERY SUPPORT FOR THE BACK REST OF A VEHICLE SEAT

Elmar Deegener, Kaiserslautern; Hans W. Voss, and Günter Franzmann, both of Rockenhausen, all of Fed. Rep. of Germany, assignors to Keiper Recaro GmbH & Co., Fed. Rep. of Germany

Filed Jun. 11, 1986, Ser. No. 873,626
Claims priority, application Fed. Rep. of Germany, Jun. 14, 1985, 3521402
Int. Cl.[4] B60N *1/00*
U.S. Cl. 297—452 **22 Claims**



1. An upholstery support for the back rest of a vehicle seat, particularly a motor vehicle seat, comprising two reinforced half-shells that are connected with each other at least along a portion of their edges, said half-shells forming hollow, box-like arms which separate from each other beginning in a hollow box in which said arms are joined and extend toward the free ends of the arms, wherein the free ends of the two arms form the lower end of the upholstery support with each of said arms having an inner boundary and an outer boundary, in which the inner boundaries of the two arms form a V-like shape that is open toward the lower end.

4,685,740

MEANS FOR SECURING A CHILD'S SEAT ON A VEHICLE SEAT BY MEANS OF A NORMAL THREE-POINT AUTOMATIC SAFETY BELT SYSTEM

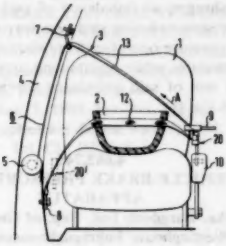
Artur Föhl, Schorndorf, Fed. Rep. of Germany, assignor to TRW Repa GmbH, Alfdorf, Fed. Rep. of Germany

Filed May 21, 1986, Ser. No. 866,061

Claims priority, application Fed. Rep. of Germany, May 30, 1985, 3519322

Int. Cl.[4] A47C *31/00*

U.S. Cl. 297—468 **5 Claims**



1. Apparatus for securing a child's seat on a vehicle seat by means of a three-point automatic safety belt system, the webbing of which is led from an end fitting secured to the vehicle over a guide fitting secured to the vehicle, to a belt takeup means and is divided by a slide buckle displaceable along the webbing into a lap portion and a shoulder portion when the slide buckle is detachably locked in a belt lock secured to the vehicle, the lap portion bearing on the child's seat disposed on the vehicle seat to secure said child's seat, and characterized in that the safety belt system is equipped with an additional clamping means which permits tightening of the lap portion and resists loosening of the lap portion.

4,685,741

CHILD PASSENGER SECURING APPARATUS

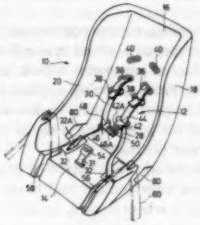
Hiroshi Tsuge; Akinori Fujiwara, and Noritada Yoshitsugu, all of Aichi, Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho and Toyota Jidosha Kabushiki Kaisha, both of Aichi, Japan

Filed Jan. 23, 1986, Ser. No. 824,565

Claims priority, application Japan, Jan. 25, 1985, 60-8847[U]

Int. Cl.[4] A47C *31/00*

U.S. Cl. 297—467 **19 Claims**



1. A child passenger securing apparatus which includes a seat body provided with a seat portion and a restraining webbing having a distal end portion, said seat body being mounted on a seat of a vehicle and secured thereto by means of an occupant restraining webbing provided by the vehicle, and said seat portion having an opening for passing an intermediate portion of said restraining webbing, said apparatus comprising:

(a) a fixed plate provided inside said body and having a through-hole in registry with the opening of the seat portion for passing said restraining webbing;

(b) a cover plate for covering the opening in the seat portion of the body, wherein said cover plate is receivable within a recess that circumscribes said opening in order to provide a flat, continuous surface around said opening;

(c) a lock plate disposed inside said apparatus body so as to be slidably movable relative to said fixed plate and having a portion for engaging said restraining webbing, wherein said restraining webbing is fastened over the child passenger seated in said body, the distal end of which passes through the opening in the seat portion, and the through-hole of said fixed plate, and loops over the engaging portion of said lock plate and which then passes through said through-hole again between said fixed plate and said lock plate, so that when tension is applied on said restraining webbing, the distal end portion of said restraining webbing is clamped between said lock plate and said fixed plate, whereby the child passenger is restrained and secured by said webbing.

4,685,742

EQUIPMENT FOR EXTRACTING ORES FROM SEA BEDS

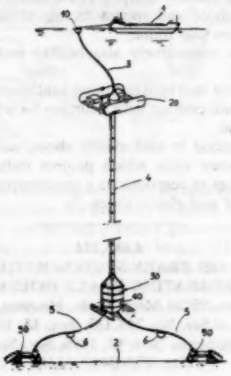
Jean-Pierre L. Moreau, La Panne, Belgium, assignor to Chantiers du Nord et de la Mediterranee, Paris, France

Filed Feb. 25, 1985, Ser. No. 704,980

Claims priority, application France, Feb. 24, 1984, 84 02813

Int. Cl.[4] E02F *7/00, 5/00*

U.S. Cl. 299—8 **11 Claims**



1. Equipment for extracting ore from sea bottoms at great depth comprising

(a) a surface ship (**1**) carrying means for supplying power required for the operation of an under-water part of said equipment and for storing the ore;

(b) a relay unit (**30**) disposed at a given height above sea bottom, said relay unit comprising ore storing, sorting and intermediate washing means, and means for raising said ore;

(c) an intermediate under-water station (**20**) interposed between said surface ship and said relay unit, an ore raising conduit (**4**) connecting said under-water station to said relay unit, and a charging conduit (**3**) connecting said intermediate station to said ship; and

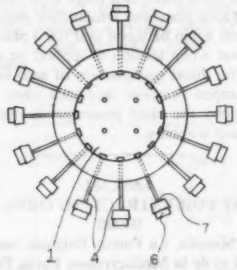
(d) at least one vehicle (**50**) for travelling along said sea bottom and comprising a propulsion system and a system for picking up, washing and treating the ore;

(e) wherein said intermediate under-water station, immersed at a given depth below the level of the water so as to be always unaffected by the swell, comprises independent means for maintaining in operation said relay unit and said at least one vehicle and for ensuring the raising and the storing of the ore in the event of a disconnection of said under-water station from said surface ship.

4,685,743
WHEEL ANTI-SKID ATTACHMENT

Hitoshi Sakurai, Suite 503, Fuji-shoji Bldg., 2-3, Sakuragaoka-cho, Shibuya-ku, Tokyo, Japan

Filed Dec. 9, 1985, Ser. No. 806,794
Int. Cl.[4] B60B *15/26*
U.S. Cl. 301—44 T 7 Claims



1. A vehicle slip protector device, comprising:

a frame having a center axis, for being fixed to a vehicle wheel for rotation therewith, with said center axis axially aligned with the axle of the vehicle wheel;

a plurality of spokes extending radially outward from said center axis radially reciprocally slidable mounted to said frame, each of said spokes having a radially outer end spaced from said frame;

elastic shoes respectively attached to said spokes at said outer end;

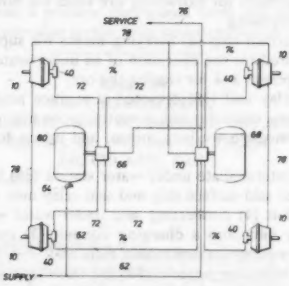
spring coils on said spokes urging said elastic shoes radially outward into contact with a surface on which the wheel is rolling; and

spikes embedded in said elastic shoes, said spikes having radially outer ends which project radially out of said elastic shoes in response to a predetermined radial compression of said elastic shoes.

4,685,744
VEHICLE AIR BRAKE SYSTEM WITH PRESSURE SEPARATING BRAKE HOUSING

Ronald W. Luce, 15910 Mesa Verde, Houston, Tex. 77059

Continuation of Ser. No. 744,320, Jun. 13, 1985, abandoned.
This application Nov. 12, 1986, Ser. No. 930,052
Int. Cl.[4] B60T *17/16*
U.S. Cl. 303—89 17 Claims



1. A vehicle brake assembly for operating a brake acuator rod, said brake assembly including

a pressure housing with a first opening on one side thereof through which said actuator rod axially operates in a braking direction and a return direction opposite thereto,

a diaphragm positioned for actuating said actuator rod in the braking direction,

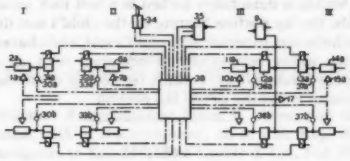
said pressure housing having a second opening on the side of said diaphragm opposite from said actuator rod for receiving pressure for actuating said diaphragm, and

a two-way, open-center shuttle valve connected to said second opening having a first input port on one side of its center for receiving pressure from a service pressure supply and a second input port on the other side of its center for receiving pressure from an emergency pressure supply, a balance of service and emergency pressures keeping the shuttle of said open-center shuttle valve centered so that the common pressure of said service and emergency pressures provide actuating pressure against said diaphragm, an imbalance of said service and emergency pressures closing said two-way valve input port to the low pressure one of said imbalance service and emergency pressures while maintaining pressure from the high pressure one of said imbalance service and emergency pressures.

4,685,745
MOTOR VEHICLE BRAKE PRESSURE-REGULATING APPARATUS

Erich Reinecke, Burgdorf, Fed. Rep. of Germany, assignor to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Jan. 22, 1986, Ser. No. 821,364
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1985, 3502049; Jan. 23, 1985, 3502051
Int. Cl.[4] B60T *8/58*
U.S. Cl. 303—100 35 Claims



1. An apparatus which regulates brake pressure of each respective wheel brake during a brake application on a motor vehicle, having at least one fluid pressure responsive braking system supplied from a fluid pressure source, said apparatus comprising:

(a) a brake valve positioned on such vehicle and connected to communicate such fluid pressure from such source to each of such respective wheel brakes during a brake application;

(b) at least one sensing means positioned on such vehicle, adjacent each respective wheel brake, for determining at least one preselected parameter which is indicative of an amount of brake pressure being applied to a corresponding one of such respective wheel brakes during such brake application, and for generating a signal value representative of such brake pressure;

(c) at least one electronically-controlled pressure-regulating valve, connected intermediate said brake valve and each of such respective wheel brakes, to control fluid pressure communication to a respective wheel brake associated with said regulating valve upon receipt of an appropriate command signal;

(d) an electronic control system, positioned on such motor vehicle, and connected to receive said signal value from said sensing means, and connected to transmit said command signal to said regulating valves based upon an evaluation of said signal value of said brake pressure; and

(e) a comparator associated with said electronic control system for evaluating said signal value of said brake pressure being applied to said corresponding one of such respective wheel brakes, said evaluation of said signal value of said brake pressure including comparing said

signal value of said sensing device adjacent each such respective wheel with one another, and initiating a command signal to said regulating valve, corresponding to such wheel brake having a stronger signal, which will switch said regulating valve from an open position to one of a closed position and a bleed position until said stronger signal is reduced to one of a specified limit value, and a difference between said stronger signal and other signal values is substantially zero.

4,685,746

ANTI-SKID BRAKE CONTROL SYSTEM FOR AUTOMOTIVE BRAKE SYSTEM WITH EXTRAPOLATION OF WHEEL ACCELERATION

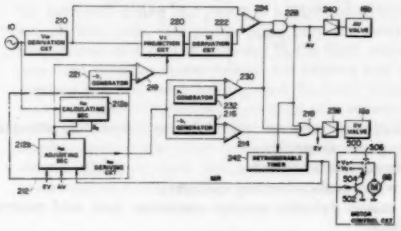
Toshiro Matsuda, Sagamihara, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jun. 5, 1985, Ser. No. 741,465

Claims priority, application Japan, Jun. 7, 1984, 59-115451

Int. Cl.[4] B60L *8/10*

U.S. Cl. 303—106 **33 Claims**



1. An anti-skid brake control system for an automotive brake system comprising:

a hydraulic brake system including a pressure control valve for adjusting braking pressure on a vehicle wheel, said pressure control valve having operation modes for performing braking pressure adjustment through at least one skid cycle which include a first mode for increasing braking pressure and a second mode for decreasing braking pressure;

a wheel speed sensor monitoring rotation speed of said vehicle wheel and producing a sensor signal;

a controller for controlling said pressure control valve so as to prevent the wheel from skidding, said controller periodically calculating a wheel acceleration value over a given interval on the basis of said sensor signal, and extrapolating changes in said wheel acceleration value in accordance with a predetermined extrapolation coefficient which varies with the operation mode of said pressure control valve, said controller further deriving a wheel slippage value on the basis of said sensor signal, and a control signal for ordering said pressure control valve to an operation mode selected according to said wheel acceleration value and said wheel slippage value.

4,685,747

BRAKE SYSTEM WITH SLIP CONTROL

Juan Belart, Walldorf; Jochen Burgdorf, Offenbach-Rumpenheim; Lutz Weise, Mainz, and Wolfram Seibert, Pfungstadt, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

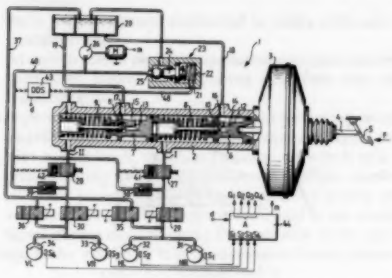
Filed Jan. 27, 1986, Ser. No. 822,750

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1985, 3502451

Int. Cl.[4] B60T *8/02*

U.S. Cl. 303—114 **4 Claims**

1. A brake system with slip control for use with an automotive vehicle having wheel brakes, said system comprising, in combination: a pedal-actuated, auxiliary pressure supported braking pressure generator to which the wheel brakes are connected by way of pressure medium conduits; a hydraulic auxiliary pressure supply system comprising a hydraulic pump, a pressure compensating and pressure medium supply reservoir, and an auxiliary pressure control valve; wheel sensors and electronic circuits for coupling to said vehicle for determination of the wheel rotational behavior and for generation of electric braking pressure control signals permitting control of electromagnetically actuatable pressure inlet and outlet valves inserted in the pressure medium conduits for slip control; wherein the auxiliary pressure control valve (**23**) is controlled by the braking pressure generated within the braking pressure generator (**1**) and, upon commencement of the slip control action, causes an auxiliary pressure proportional to the braking pressure to be built up in the auxiliary pressure supply system (**23, 26**), said auxiliary pressure causing hydraulically actuatable valve arrangements (**27, 28, 38, 39, 45, 46**) to be switched over; said valve arrangements, which are inserted in the pressure medium conduits leading from the braking pressure generator (**1**) to the inlet valves (**29, 39**), being open when in idle



position and, upon switching over to a second switch position, hydraulically connecting the auxiliary pressure supply system (**23, 26**) instead of the braking pressure generator (**1**) with the inlet valves (**29, 39**) and/or the wheel brakes (**31–34**), wherein the hydraulic pump (**26**) comprises a drive motor (M) which can be started as the slip control action starts, wherein the braking pressure generator (**1**) is designed as a tandem master cylinder (**2**) with a vacuum-type booster (**3**) connected before it, wherein a control inlet port (**21**) of the auxiliary pressure control valve (**23**) is connected with one of two brake circuits (I, II) of said tandem master cylinder (**2**), wherein the switching over of the valve arrangements (**27, 28 45, 46**) to their second switch position causes the brake circuits (I, II) or pressure medium circuits of the braking pressure generator (**1**) to be cut off, and wherein the hydraulically actuatable valve arrangements (**45, 46**) are provided as three-way/two-position directional control valves hydraulically connecting the wheel brakes (**31–34**), when in idle position, with the braking pressure generator (**1**) and, upon switching over, with the auxiliary pressure supply system (**23, 26**) with a third pressure medium path in each case being locked.

4,685,748

CONTROL SYSTEM FOR AIRCRAFT WHEEL BRAKES AND METHOD

Melvin C. Zoerb, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 24, 1984, Ser. No. 685,344

Int. Cl.[4] B60T *8/42;* **B64C** *25/42*

U.S. Cl. 303—115 **9 Claims**

5. An aircraft wheel brake controlling system, comprising:

a first stage metering valve including a pressure port, a return port, an output port and a port control member;

a foot pedal control, operable by the pilot, and including means connecting it to the port control member such that

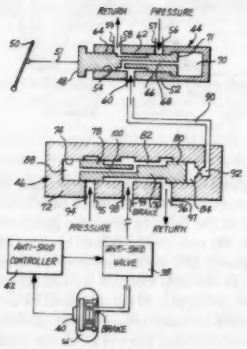
when the foot pedal is depressed by the pilot a force will be exerted on the port control member, for urging it in a first direction in an amount proportional to pilot applied force on the foot pedal control;

said first stage metering valve including feedback means operable by a feedback pressure from the output port of the valve to exert a force on the port control member opposite to the foot pedal applied force;

a second stage metering valve including a pressure port, a return port, a brake port, a second port control member and a control pressure chamber;

passageway means connecting the output port of the first stage metering valve with said control pressure chamber, for delivering fluid pressure into said chamber and against a portion of the second valve port control member, for urging it in a first direction;

said second stage metering valve including a feedback chamber and a feedback passageway connecting said feedback chamber with the brake port of the second stage metering valve;



said feedback chamber being arranged to exert a feedback force on the second port control member in a direction opposite to the control pressure force;

an aircraft wheel brake including fluid operated brake applying means;

conduit means connecting the brake port of the second stage metering valve with the fluid operated brake applying means;

means connecting the pressure ports of the two valves to a supply pressure and the return ports to a return pressure;

said first stage metering valve having an off position in which there is essentially no force on the foot pedal, the pressure port of the first stage metering valve is closed and the output port of the first stage metering valve is connected to return; and

said second stage metering valve having an off position in which the pressure port is closed and the brake port is connected to the return port.

4,685,749

HYDRAULIC PRESSURE CONTROL DEVICE FOR USE IN VEHICLE ANTI-SKID BRAKING SYSTEM

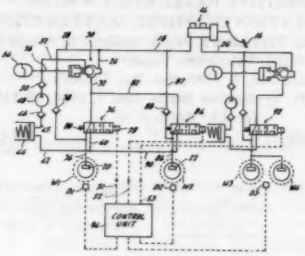
Hiromi Otsuki; Ryoichi Matsuura; Hiroshi Fujinami; Shinichi Hori, all of Anjo; Yoshihisa Nomura, Toyota, and Hiroyuki Oka, Susono, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Oct. 19, 1984, Ser. No. 662,630

Claims priority, application Japan, Oct. 20, 1983, 58-196640; Nov. 4, 1983, 58-208027

Int. Cl.[4] B60T *8/40*

U.S. Cl. 303—116 **4 Claims**



1. A hydraulic pressure control device in a vehicle anti-skid braking system, comprising:

(a) a brake master cylinder;

(b) a wheel brake actuating cylinder;

(c) a master cylinder passage extending from said master cylinder;

(d) a fluid pressure supply passage connected to said wheel brake actuating cylinder;

(e) a control unit responsive to a wheel condition for generating a command signal;

(f) directional control valve means disposed in said fluid pressure supply passage and having at least first and second selective positions, said directional control valve means being normally shifted to said first position to open said fluid pressure supply passage;

(g) a fluid pressure return passage connected to said directional control valve means, said return passage including a reservoir and a pump; and

(h) a pressure control valve connected between said master cylinder passage, said fluid pressure supply passage, and said fluid pressure return passage, said pressure control valve being normally shifted to connect said master cylinder passage and said fluid pressure supply passage, said directional control valve means being actuable in response to said command signal for closing said fluid pressure supply passage and connecting said wheel brake actuating cylinder to said fluid pressure return passage, so that said pressure control valve can be actuated to disconnect said fluid pressure supply passage from said master cylinder passage and connect said fluid pressure return passage to said fluid pressure supply passage in response to a fluid pressure supplied from said wheel brake actuating cylinder into said fluid pressure return passage when said directional control valve means is actuated,

said pressure control valve having a valve housing, a first inlet port defined in said valve housing and connected to said master cylinder passage, a second inlet port defined in said valve housing and connected to said fluid pressure return passage, an outlet port defined in said valve housing and connected to said fluid pressure supply passage, and directional control means movably disposed in said valve housing for selectively providing fluid communication between said first inlet port and said outlet port and fluid communication between said second inlet port and said outlet port;

said valve housing further having a first valve chamber communicating with said first inlet port and said outlet port,

said pressure control valve including a piston movably disposed in a bore in said valve housing and having a second valve chamber opening into said bore and an axial through passage opening into said second valve chamber, said bore communicating with said second inlet port,

said directional control means comprising a first valve body movably disposed in said first valve chamber, a second valve body movably disposed in said second valve chamber, and a rod extending through said axial through passage and having ends engageable with said first and second valve bodies, and

said pressure control valve further including a first spring disposed in said valve housing and acting on said first valve body for normally urging the same to connect said first inlet port to said outlet port, a second spring disposed in said piston and acting on said second valve body for normally urging the same to close said axial through passage out of communication with said second valve chamber, and a third spring disposed in said valve housing for normally urging said piston in a direction toward said second inlet port, said piston being movable away from said second inlet port in response to the fluid pressure in said fluid pressure return passage for causing said rod to displace said first valve body against the force of said first spring to close said first inlet port out of communication with said outlet port and then for causing said rod to displace said second valve body against the force of said second spring to open said axial through passage into communication with said second valve chamber.

4,685,750

RAILWAY VEHICLE BRAKE SYSTEM WITH IMPROVED BLENDING CONTROL OF PNEUMATIC AND ELECTRIC BRAKES

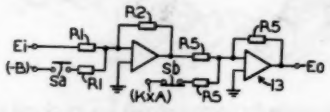
Asaji Imanaka, Kobe, Japan, assignor to Nippon Air Brake Co., Ltd., Kobe, Japan

Division of Ser. No. 720,670, Apr. 8, 1985, Pat. No. 4,639,047. This application Sep. 2, 1986, Ser. No. 902,859

Claims priority, application Japan, Apr. 13, 1984, 59-55311[U]

Int. Cl.⁴ B60T *13/70, 15/54*

U.S. Cl. 303—15 **5 Claims**



1. A brake control system for a railway vehicle having an electric brake system and a fluid pressure brake system, said brake control system comprising:

(a) means for providing a brake command signal according to the desired total brake power of said vehicle;

(b) said electric brake system being operative in response to said brake command signal to provide vehicle brake power;

(c) means for providing a feedback signal corresponding to the effective vehicle brake power provided by said electric brake system;

(d) a first bias signal;

(e) an electrical amplifier circuit having an output derived in a first operating condition from said feedback signal and said bias signal at a first amplification ratio and derived in a second operating condition from said feedback signal along at a second amplification ratio;

(f) detecting means operative in response to a decrease in said electric brake feedback signal for causing said amplifier circuit to change from said first operating condition to said second operating condition;

(g) said amplifier circuit comprising:

(i) a first amplifier having an input terminal and an output terminal;

(ii) a first resistor via which said electric brake feedback signal is connected to said first input terminal of said first amplifier;

(iii) a second resistor connected between said input and output terminals of said first amplifier;

(iv) a third resistor via which a second bias signal is connectable with said first amplifier input in parallel with said electric brake feedback signal;

(v) a fourth resistor between said output terminal of said first amplifier and said input terminal of said second amplifier;

(vi) a fifth resistor between said input and output terminals of said second amplifier;

(vii) a sixth resistor via which said first bias signal is connected to said second amplifier input terminal in parallel with said fourth resistor;

(viii) a first contact connected in series with said third resistor;

(ix) a second contact connected in series with said sixth resistor; and

(x) switch means operative in response to operation of said detector means for operating said first and second contacts; and

(h) operator means for subtracting said output signal of said amplifier circuit from said brake command signal to provide a difference signal in response to which said fluid pressure brake system is operative to provide supplemental brake power such that the total brake power of said vehicle corresponds substantially to said brake command signal during and following the transition from said electric brake system to said fluid pressure brake system.

4,685,751

OUTWARDLY PULLABLE DRAWER OR SLIDING TRAY FOR FURNITURE

Hans-Werner Düpree, Osnabrücker Landstrasse 154, D-4830 Gütersloh 11, Fed. Rep. of Germany

Filed May 3, 1985, Ser. No. 729,995

Claims priority, application Fed. Rep. of Germany, May 5, 1984, 3416627

Int. Cl.⁴ A47B *48/00*

U.S. Cl. 312—263 **17 Claims**

1. A drawer assembly comprising:

a drawer having a forward wall;

a front cover for the drawer;

a set of hardware for connecting the drawer with the front cover, such that the front cover is fixable in at least one direction in the main plane of the extent of the front cover;

at least two forked gripping members disposed a distance apart, each gripping member having a pair of jaws and being attached to one of the drawer and the front cover, the jaws of each gripping member defining an insertion slot and a clearance between the jaws;

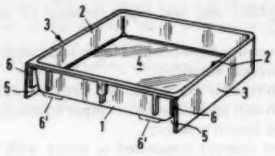
a closing element connected to the jaws and operable to be tightened so as to press the jaws together so as to fix the front cover to the drawer;

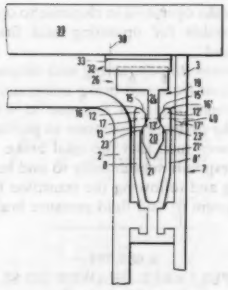
a neck-like web member for each such gripping member, disposed in the insertion slot of the corresponding forked gripping member, disposed opposite to, and aligned with the corresponding forked gripping member and bearing a thickened head member having a thickness less thick than the maximum clearance between the said jaws when the head member is inserted into the gripping member;

inclined surfaces between the thickened head member and the neck-like web member, positioned on one of the web member and the gripping member, located immediately behind the head member, and in an interior region between the said jaws immediately behind the insertion slot,

which inclined surfaces cooperate with abutting projections, so that when said jaws are pressed together, clearances are present between said neck-like web member and outer ends of the said jaws, and between the head member and the interior regions of the said jaws, which interior regions are aligned with the head member; and

a first fitting piece on each forked gripping member, disposed at the front of the drawer and closely adjacent to the forward wall of the drawer, and a second fitting piece for each forked gripping member, the second fitting piece





slidably carrying the first fitting piece and being mounted on the rear side of the front cover, the positions of the inclined surfaces and projections disposed on the forked gripping member and head member and the distances of said inclined surfaces and projections from the front cover being mutually arranged such that, with the head inserted in the forked gripping member, the front cover is adjustably held against the front surface of the drawer and such that, with the closing element tightened, the front cover is fixed against the front surface of the drawer.

4,685,752

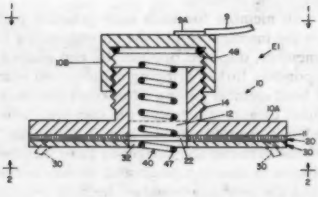
ELECTRICAL CONNECTOR

Lowell W. Costar, 5017 N. 115th St., Omaha, Nebr. 68164

Filed Oct. 6, 1986, Ser. No. 915,558

Int. Cl.[4] H01R *13/648*

U.S. Cl. 439—96 **12 Claims**



1. Electrical connector securely attachable with a laminar adhesive to the linearly generated external surface of a metallic structure, said electrical connector comprising:

(A) a frame member including an upper-side and also a substantially horizontal and linearly generated lower-side that is provided with at least one central-opening for said frame member, and said frame member upper-side including a housing portion overlying said centrally-open lower-side;

(B) a laminar adhesive carried by and extending horizontally along said frame member lower-side and including at least one central-opening in vertical alignment with a frame member lower-side central-opening;

(C) at least one electrically conductive contact member located within said frame housing portion and including a free-end extending through said vertically aligned central-openings, whereby said free-end is at an elevation below that of the laminar adhesive, and said contact member being upwardly manually deflectable to an extent that said free-end can become substantially co-elevational with said laminar adhesive and in electrically conductive abutment with said metallic structure; and

(D) an electrically conductive terminal member attached in electrically conductive relationship to said contact member remote from the free-end thereof.

4,685,753

INTERCONNECTION APPARATUS FOR WIRING HARNESSES

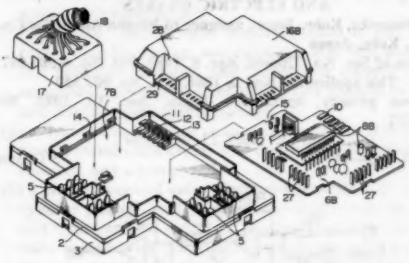
Isao Isshiki, Nara, and Hitoshi Hayashi, Suzuka, both of Japan, assignors to Tokai Electric Wire Company Limited, Japan

Continuation of Ser. No. 626,630, Jul. 2, 1984, abandoned. This application Mar. 26, 1986, Ser. No. 843,850

Claims priority, application Japan, Jul. 5, 1983, 58-122640

Int. Cl.[4] H01R *9/09*

U.S. Cl. 439—74 **10 Claims**

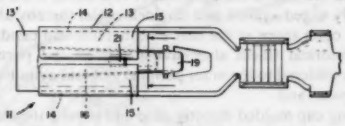


1. An apparatus for interconnecting branch circuit means of a wiring harness and functional component circuit means comprising a wiring board including an insulated board carrying a busbar forming branch conductive path means and printed-circuit board means mounted on said wiring board and including a plurality of functional components forming said functional component circuit means, said busbar of said wiring board including a plurality of tab contact means at end portions thereof extending perpendicularly to said insulating board, and said printed-circuit board means including a plurality of flat sheet terminals disposed in side by side relation folded around one edge of said printed-circuit board means and connected electrically by a detachable connection to said certain ones of said tab contact means upon insertion of said printed-circuit board means onto said wiring board and a plurality of tab terminals located on and carried by said printed-circuit board and extending parallel to and juxtaposed to other ones of said tab contact means, said tab terminals and said other ones of said tab contact means being arranged to simultaneously receive respective contacts of a multiple contact connector block connecting said tab terminals and said other ones of said tab contact means to respective of said branch circuit means.

4,685,754
ELECTRICAL TAB RECEPTACLE

Daniel R. Coldren, Enola, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 13, 1985, Ser. No. 808,760
Int. Cl.[4] H01R *11/22, 13/62*
U.S. Cl. 439—270 1 Claim

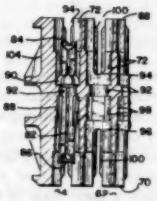


1. An electrical receptacle for tabs of small size which receptacle is formed from sheet metal and comprises a generally channel-shaped receptacle portion having a base and upstanding side walls with free edge portions of the side walls bent towards each other over the base, the base being formed with a substantially flat axial extension located forwardly of the sidewalls and inclined downwardly towards a leading free end, a locking tongue struck out from the base to extend rearwardly within the receptacle portion from a front root end integral with the base at a location substantially in transverse alignment with leading ends of the side walls to a rear free end formed with a release member projecting out of the receptacle portion, a locking projection on the tongue between the ends providing a rearwardly facing shoulder for latching engagement in a recess in a tab inserted into the receptacle, unlatching movement of the tongue being obtained by depression of the release member, the tongue being formed into arcuate transverse cross section such that it is stiff, constituting with the extension a torsion bar of generally T-shape, unlatching movement of the tongue towards the base to release the tab causing resilient torsional flexure of the base portion with upward pivotal movement of the leading end of the extension.

4,685,755
TERMINAL ASSEMBLY

Daniel M. Pitsch, Minneapolis, Minn., assignor to ADC Telecommunications, Inc., Minneapolis, Minn.

Filed Feb. 19, 1986, Ser. No. 830,978
Int. Cl.[4] H01R *4/24*
U.S. Cl. 439—404 13 Claims

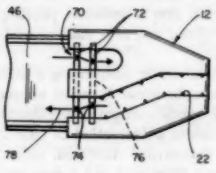


1. A terminal assembly comprising:
a base member;
a terminal member having an elongated panel formed of electrically insulative material and defining a plurality of parallel aligned connector receiving chambers extending through said panel from a first longitudinal edge to a second longitudinal edge thereof, a first plurality of slits formed through said panel at said first edge and a second plurality of slits formed through said panel at said second edge, said slits disposed transverse to said edges with said slits extending through opposite side faces of said panel and in communication with said chambers, a plurality of electrical connectors formed of electrically conductive material and sized to be securely received within said chambers with a connector received within a chamber presenting a first end adjacent said first longitudinal edge and having a first wire receiving slot aligned with a side of one of said first plurality of slits extending through a first side face of said panel and said connector first end having a first wire terminating blade aligned with a side of said slit extending through a second side face of said panel, said connector presenting a second end adjacent said panel second longitudinal edge and having a second wire receiving slot aligned with a side of one of said second plurality of said slits extending through said first side face and a second wire terminating blade aligned with a side of said second slit extending through said second side face;
first latch means for releasably securing said terminal member to said base member in a first position with said first edge exposed and with said second edge opposing said base member;
second latch means for releasably securing said terminal member to said base member in a second position with said second edge exposed and with said first edge opposing said base member;
first guide means for guiding a first plurality of wire conductors from side ends of said base member and said terminal member to connector ends on one of said longitudinal edges;
second guide means for guiding a second plurality of wire conductors from a location intermediate said side ends to connectors on another of said longitudinal edges; and
window means defined between said base member and terminal member and sized to accommodate flexing of said second plurality of conductors as said terminal member is moved between said first and second positions.

4,685,756
DROP-WIRE CLOSURE HAVING A HIGH AXIAL STRENGTH

Jose P. Gamarra, Union City, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed May 9, 1986, Ser. No. 861,673
Int. Cl.[4] H01R *4/24*
U.S. Cl. 439—426 11 Claims



1. A closure comprising:
a casing including first and second fixed-sized passageways; and
an insulation displacement connector disposed within each of the passageways, said connector comprising a pair of spaced-apart walls each having at least one slot therein for receiving a wire wherein the slots in each pair of spaced-apart walls are laterally offset from one another

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4,685,757
ELECTRICAL WIRE CONNECTOR AND CONNECTION METHOD

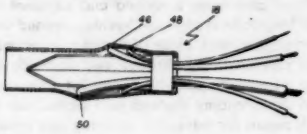
Jon S. Elliott, 305 Windsor St., Park Forest, Ill. 60466

Filed Apr. 18, 1986, Ser. No. 856,417
Int. Cl.[4] H01R *9/06*
U.S. Cl. 439—426 32 Claims

1. A connector for connecting electrical wire, comprising:
electrically conductive blade means having an elongated edge;

guide means separate from said blade means for guiding a wire inserted into the connector past said blade means;

retaining means for retaining the free end of the wire when it is doubled back and reinserted into the connector on the opposite side of said blade means; and



means for wedging the bend formed in the wire tightly against said blade edge as the wire is pulled back, without movement of said blade means relative to said guide means, to thereby effect a secure mechanical connection of the wire to said blade means.

4,685,758

CONNECTOR PLUG

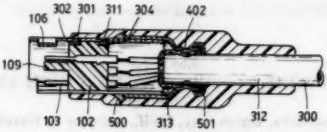
Noboru Yoshida, Gunma, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan

Filed Mar. 3, 1986, Ser. No. 835,662

Claims priority, application Japan, Jun. 7, 1985, 60-86147[U]

Int. Cl.[4] H01R *13/658*

U.S. Cl. 439—606 **8 Claims**



1. A connector plug comprising:

an insulating body;

a plurality of contact pins carried by said insulating body in parallel relation to each other, each of said pins having a contact portion and a terminal portion extending outwards of the front and rear ends of said insulating body respectively;

a cylindrical metal cover comprising a resilient metal sheet rolled into a cylindrical form of substantially constant diameter, the opposite edges of the sheet being free edges to permit resilient deformation of said cylindrical metal cover in its diametrical direction, said cylindrical metal cover having a front end and a rear end, said insulating body being disposed within said cylindrical metal cover with the rear end of said insulating body located inward of the rear end of said cover so that said rear end of said insulating body and an inner wall surface of said cylindrical metal cover rearward of said rear end of said insulating body jointly define an open space;

a plurality of smooth protuberances extending inwardly of the outer periphery of said cylindrical metal cover, said insulating body being fixedly engaged by said protuberances with said contact pins extending parallel to the axis of said cylindrical metal cover toward the front end of said cover;

a shielded cable located adjacent the rear end of said open space and having a plurality of conductor wires which extend into said open space and are connected in said open space to said terminal portions of said contact pins, said cable including an interior shield braid an end portion of which is folded back onto an exterior surface of said cable to cover the end portion of said shielded cable from which said conductor wires extend, said shielded cable extending rearwardly of said open space and outwards of said cylindrical metal cover from the rear end of said cover;

a conductive cylindrical shield having a large diameter portion which is fitted around the rear end of said cylindrical metal cover to substantially cover said open space, said conductive cylindrical shield having a wall thickness greater than that of said cylindrical metal cover and having a rear end portion of reduced diameter which is positioned on the folded-back portion of said shield braid and caulkedly urged against said shielded cable, thereby closing said open space at the rear end thereof, said conductive cylindrical shield also having a front end portion which is soldered to the outer periphery of said cylindrical metal cover; and

an insulating cap molded directly onto and around the outer periphery of said cylindrical metal cover except for a front end portion of said cover whereby said front end portion of said cover remains exposed, said cap including a comparatively thin wall portion extending rearwardly of said exposed portion of said metal cover and a thicker wall portion of greater diameter than said thin wall portion integral with said thin wall portion and extending rearwardly thereof around the outer periphery of said conductive cylindrical shield and beyond said rear end portion of said conductive cylindrical shield, a rear portion of said insulating cap extending along and around said shielded cable to define a cable protector.

4,685,759

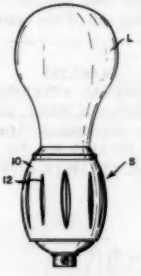
ENERGIZABLE LAMP SOCKET

John G. Kurtz, 45 Oak Bend La., Rochester, N.Y. 14617

Filed Jan. 9, 1986, Ser. No. 817,472

Int. Cl.[4] H01H *19/00*

U.S. Cl. 200—51.14 **16 Claims**



1. In a lamp socket adapted to receive an incandescent lamp of the type having a cylindrically shaped base supporting a plurality of spaced electrical contacts through which electrical energy can be selectively connected to lamp filament(s), said socket comprising a housing for receiving the lamp base, said housing supporting a plurality of spaced electrodes which engage said contacts when a lamp base is received by said housing, the improvement comprising:

switch means for selectively connecting at least one of said electrodes to a source of electrical energy, said switch means comprising (a) a cylindrically shaped sleeve concentrically arranged with respect to and surrounding the cylindrical base of a lamp received by said housing, said sleeve having a planetary ring gear arranged about its interior surface; (b) means for supporting said sleeve for rotational movement about its longitudinal axis; (c) a pinion gear rotatably mounted on said housing and positioned to be rotatably driven in response to rotational movement of said sleeve; and (d) connecting means responsive to to rotational movement of said pinion gear for selectively connecting and disconnecting said at least one electrode to a source of electrical energy.

4,685,760

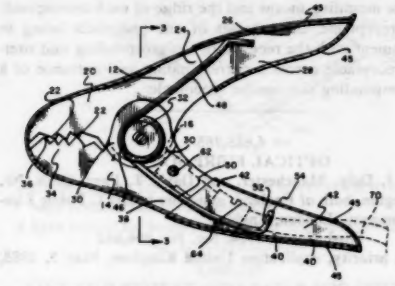
BOOSTER HANDLE

Max D. Mize, 712 N. Springfield, Anthony, Kans. 67003

Filed Feb. 24, 1986, Ser. No. 831,836

Int. Cl.[4] H01R *4/40*

U.S. Cl. 439—822 15 Claims



1. A battery contact clamp for use in charging batteries within an automobile comprising

a lower member having a pair of lower parallel ears with aligned lower apertures and having one end terminating into a lower jaw portion having a structure defining a plurality of teeth;

an upper member having a pair of upper parallel ears with aligned upper apertures that register with the lower apertures of said lower parallel ears of said lower member when said upper parallel ears and said lower parallel ears mate, said upper member additionally having an end terminating into an upper jaw portion having a structure defining a plurality of teeth;

a rivet means passing through said lower and upper apertures pivotally securing said lower member to said upper member such that the jaw portions of the lower and upper member cooperate with each other respectively;

torsion spring means for urging said jaw portions together in a touching relationship about said rivet means and maintaining said jaw portions in a touching relationship when said clamp is in a closed posture, said torsion spring means having convolutions that are postioned around the rivet means and an upper end and a lower end that respectively engage the upper and lower members, said upper end and said lower end of said torsion spring means extend away from said rivet means in the same direction and in an opposed relationship with respect to each other.

a lug terminal means pivotally secured to said lower member, said lug terminal means being contacted biasing by said lower end of said torsion spring means to retain and urge said lug terminal engaged to the lug terminal means against the lower member.

4,685,761

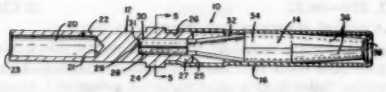
ELECTRICAL CONTACT ASSEMBLY AND METHOD OF ASSEMBLY

Ronald P. Locati, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 665,597, Oct. 29, 1984, abandoned, which is a continuation of Ser. No. 364,153, Mar. 31, 1982, abandoned. This application Feb. 5, 1986, Ser. No. 827,474

Int. Cl.[4] H01R *11/22*

U.S. Cl. 439—843 18 Claims



1. An electrical contact assembly of the type including a wire barrel member to which an electrical conductor means is to be connected and a telescoped receptacle contact member and hood member secured onto the wire barrel member, characterized in that:

said wire barrel member includes a rearard conductor-receiving section in which electrical conductor means is to be connected, and further includes a bore means extending inwardly from a front end of said wire barrel member, said bore means having a continuous circumference therearound and further having a forwardly facing stop surface means therewithin spaced rearwardly from the front end thereof and located forwardly of said conductor-receiving section;

said receptacle contact member is stamped and formed of metal and has a receptacle contact section and a securing section frictionally secured in said bore means in said wire barrel member, with the rearward end thereof disposed forwardly of and against said forwardly facing stop surface means; and

said hood member has an inner end secured onto said wire barrel member and extends forwardly therefrom covering said receptacle contact section.

4,685,762

INFRA-RED RADIATION DEVICE

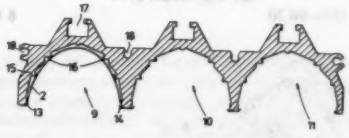
Thomas Björnberg, Vargön, Sweden, assignor to Infrarodteknik AB, Vänersborg, Sweden

Filed Jan. 18, 1985, Ser. No. 693,213

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1984, 8401528[U]

Int. Cl.[4] G02B *7/00*

U.S. Cl. 350—1.1 3 Claims



1. An infra-red radiation device comprising:

a reflector body means having mounted thereon at least one lamp holder for accommodating IR lamps;

said reflector body means having free edges thereon and projections extending towards one another from said free edges;

a reflector plate mounted between said projections;

wherein there is provided an air gap between said reflector plate and said reflector body means.

4,685,763

LIGHT MODULATION DEVICE

Kunio Tada, Urawa; Yoshikazu Nishiwaki, and Shunji Matsuoka, both of Osaka, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 595,850, Apr. 2, 1984, abandoned. This application Aug. 27, 1986, Ser. No. 902,090

Claims priority, application Japan, Mar. 31, 1983, 58-56947

Int. Cl.[4] G02B *6/12*

U.S. Cl. 350—96.14 5 Claims

1. A light modulation device comprising:

a substrate of a compound semiconductor crystal having a high carrier density;

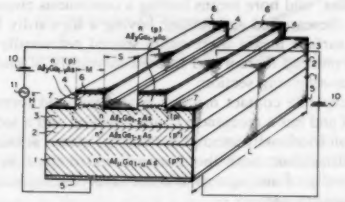
a substrate layer of a compound semiconductor single crystal having a high carrier density epitaxially grown on the substrate;

an optical waveguide layer of a compound semiconductor single crystal having a low carrier density epitaxially grown on the substrate layer;

two buffer layers of a compound semiconductor single crys-

tal having a low carrier density epitaxially grown on the optical waveguide layer and formed by etching in parallel and sufficiently close to each other so that evanescent wave coupling occurs;

an electrode in ohmic contact with the substrate; and electrodes in Schottky contact with the buffer layers respectively;



wherein said substrate, substrate layer, optical waveguide layer, and buffer layers are all of either n-type or p-type semiconductor, and that said optical waveguide layer has a refractive index at least approximately 0.1% higher than any of those of the substrate layer and the buffer layers.

4,685,764

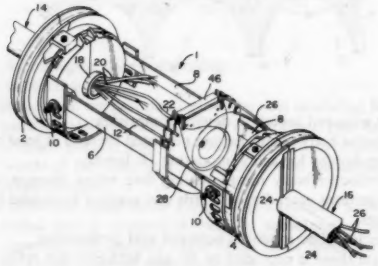
SPLICE ORGANIZER FOR OPTICAL CABLE SPLICES

John C. Hoffer; Bernard G. Caron, both of Harrisburg, and Martin R. Rupert, Hummelstown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 697,311, Feb. 1, 1985. This application Apr. 30, 1985, Ser. No. 729,101

Int. Cl.[4] G02B *6/44*

U.S. Cl. 350—96.20 **8 Claims**



1. In a splice organizer for optical conductors projecting from corresponding optical cables, for optical connector bodies connected to respective ends of the optical conductors, and for optical splices formed by the connector bodies being in opposed pairs to align respective ends of the optical conductors, a pair of similar receptacles each having a side wall, an open side and a ridge projecting from the side wall to the open side for mounting against a side wall of a similar receptacle to provide a compartment for said optical conductors, the improvement comprising;

splice mounting means for mounting said splices and projecting from each corresponding side wall and extending in the same direction as a corresponding said ridge,

pin extensions projecting from each corresponding said ridge,

openings in each corresponding said side wall in alignment with the pin extensions projecting from the ridge of the same corresponding said side wall of the same receptacle,

said openings being constructed for interference fit engagement with corresponding pin extensions of a corresponding said similar receptacle,

optical conductor receiving openings into respective compartments defined between the splice mounting means and the ridges of respective receptacles, the openings providing entrances of said compartments for receiving said optical conductors and,

a series of cable receiving recesses in the side wall of each corresponding receptacle and distributed between the splice mounting means and the ridge of each corresponding receptacle, the recesses of one receptacle being in alignment with the recesses of a corresponding said similar receptacle across a corresponding said entrance of a corresponding said similar receptacle.

4,685,765

OPTICAL FIBRE JOINT

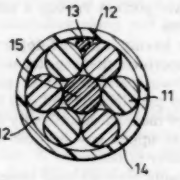
Michael J. Daly, Manchester, and David T. Parr, Croft, Nr. Warrington, both of England, assignors to BICC Public Limited Company, London, England

Filed May 3, 1984, Ser. No. 606,662

Claims priority, application United Kingdom, May 5, 1983, 8312313

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.21 **11 Claims**



1. An optical fibre joint comprising an elongate core consisting of at least two elongate members assembled together, at least two of said elongate members being of such transverse cross-sections that adjacent radially outer parts of surfaces of said adjacent members define between said parts an interstice which extends lengthwise of the core; a sleeve of elastomeric material so tightly surrounding the core that the sleeve is in a stretched condition; and two optical fibres aligned in the interstice with their neighbouring end faces in close proximity, the interstice being of such a depth and the elastomeric sleeve being so stretched, having regard to the diameters of the optical fibres, that the aligned optical fibres are tightly held in the interstice and against the two elongate members defining the interstice by the elastomeric sleeve.

4,685,766

OPTICAL DEVICE

Yukuo Nishimura, Sagamihara; Eigo Kawakami, Kawasaki; Toshiaki Asano, Yokohama; Masahiro Haruta, Funabashi; Hiroshi Takagi, Yokohama; Takashi Noma, Tokyo; Nobutoshi Mizusawa, Yokohama; Mitsunobu Nakazawa, and Kunitaka Ozawa, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 16, 1984, Ser. No. 570,814

Claims priority, application Japan, Jan. 22, 1983, 58-8868; Jan. 22, 1983, 58-8869; Jan. 22, 1983, 58-8870; Jan. 22, 1983, 58-8871; Jan. 22, 1983, 58-8872

Int. Cl.[4] G02B *6/20*

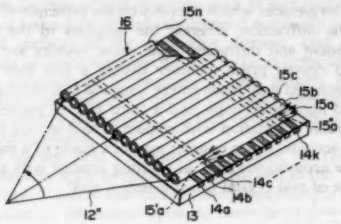
U.S. Cl. 350—96.32 **10 Claims**

1. An optical apparatus comprising:

an optical device including an optical waveguide having a liquid core layer of a material with a relatively high refractive index and a clad layer of a material having a relatively low refractive index covering said core layer;

a heating means for externally heating a predetermined region of said liquid core layer below its boiling point such

that the refractive index of said predetermined region is lowered;



a cooling means for eliminating the lower refractive index of said predetermined region; and

a light source for supplying light to said optical waveguide.

4,685,767

FINE ADJUSTMENT APPARATUS FOR OPTICAL SYSTEM LENS

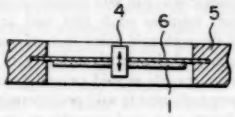
Nozomu Ueshiba, Hirakata; Tetsuji Fukada, Suita, and Yukihiko Ise, Toyonaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 21, 1985, Ser. No. 703,998

Claims priority, application Japan, Feb. 27, 1984, 59-36566; Nov. 16, 1984, 59-242888

Int. Cl.⁴ G02B *7/04*; H02L *41/04*

U.S. Cl. 350—255 **6 Claims**



1. A fine adjustment apparatus for an optical system lens, comprising:

at least one annular piezoelectric vibrator element having an axis of symmetry, a thickness dimension parallel to the axis of symmetry, a circular inner periphery having an inner peripheral diameter, a circular outer periphery having an outer peripheral diameter, and axial end surfaces extending between said inner and outer peripheries and normal to the axis of symmetry and constituting electrodes, said vibrator element having an axis of polarization extending parallel to the axis of symmetry;

an annular, planar thin metal plate to which said vibrator element is laminated along said inner and outer peripheries of said vibrator element, said plate having an inner periphery with a diameter smaller than the inner peripheral diameter of said vibrator element, a circular outer periphery with a diameter greater than the outer peripheral diameter of said vibrator element, and upper and lower end surfaces extending between the inner and outer peripheries thereof, said inner periphery of said plate being bonded to the lens system; and

a support member to which said upper and lower end surfaces at the outer periphery of said plate are fixed at a location spaced from said outer periphery of said vibrator element.

4,685,768

COLOR CONTROL IN HOLOGRAMS

Jeffrey Blyth, Brighton, England, assignor to Blyth Holographics Limited, London, England

Filed Nov. 22, 1985, Ser. No. 800,672

Int. Cl.⁴ G03H *1/04*

U.S. Cl. 350—320 **10 Claims**

1. A method of effecting colour control in a hologram of the type having interference fringes lying generally parallel to the substrate, according to which:-

(a) the holographic film is initially exposed to laser light in a conventional manner in order to produce a coloured holographic image of the aforesaid type,

(b) the hologram is at least partially developed and stopped,

(c) the film is further exposed to light of sufficient intensity and for sufficient duration to enable a second development step and then a bleaching step to be effected, thereby to change the colour of the holographic image from that produced by the original exposure to laser light.

4,685,769

DISPLAY DRIVE CIRCUIT

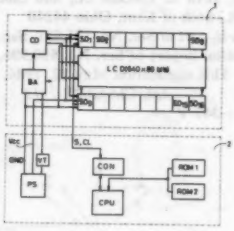
Tositaka Fukuma, Yamatokoriyama, and Masaharu Satoh, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 24, 1984, Ser. No. 643,880

Claims priority, application Japan, Sep. 5, 1983, 58-163604

Int. Cl.⁴ G07G *3/29*

U.S. Cl. 350—332 **5 Claims**



1. A display drive circuit for driving a display comprising:

a display memory storing dot patterns for display and developing a plurality of segment signals for supply to said display, said dot patterns being provided by a plurality of input signals, selected locations within said display memory being selected by memory addresses corresponding to positions of various elements of said display; and

means for selectively converting said input signal addresses to be supplied said display memory in response to a mode select signal, said means for inverting further selectively inverting output signals developed by said display memory;

said means for inverting facilitating use of said drive circuit with the display having input pins arranged in at least two configurations.

4,685,770

DISPLAY DEVICE, PARTICULARLY A LIQUID CRYSTAL DISPLAY, AND METHOD FOR THE MANUFACTURE THEREOF

Holm Baeger, Schwalbach, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 9, 1985, Ser. No. 689,908

Claims priority, application Fed. Rep. of Germany, Jan. 9, 1984, 3400429

Int. Cl.⁴ G02F *1/13*

U.S. Cl. 350—344 **5 Claims**

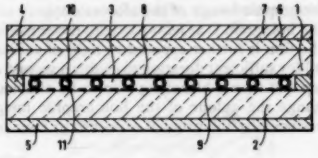
1. A display device comprising:

two support plates parallel to each other; and optical medium enclosed between said two support plates, said optical medium being switchable between two different optical states;

a set of spacers distributed between the support plates; and wherein

each of said spacers comprises an adhesive layer and an

encapsulating layer disposed about the adhesive layer, the encapsulating layer decomposing under pressure and



temperature to effect a bonding between the support plates.

4,685,771

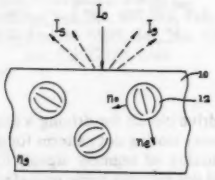
LIQUID CRYSTAL DISPLAY MATERIAL COMPRISING A LIQUID CRYSTAL DISPERSION IN A THERMOPLASTIC RESIN

John L. West, 5050 Fish Creek Rd., Stow, Ohio 44224; Joseph W. Doane, 1618 S. Lincoln St., and Slobodan Zumer, 917 Allerton St., both of Kent, Ohio 44240

Continuation-in-part of Ser. No. 776,831, Sep. 17, 1985, which is a continuation-in-part of Ser. No. 590,996, Mar. 19, 1984, abandoned. This application May 22, 1986, Ser. No. 866,216

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—347 V **22 Claims**



1. A light modulating, liquid crystal-plastic material capable of transmitting and scattering light comprising:

microdroplets of liquid crystal dispersed in a thermoplastic resin, said microdroplets being of a size effective to scatter incident light when the optical axes of said microdroplets are randomly aligned, and said microdroplets being formed by phase separation from a homogeneous solution of said liquid crystal and thermoplastic resin.

15. A method of making a light modulating, liquid crystal-plastic material capable of transmitting and scattering light comprising the steps of:

forming a homogeneous solution by dissolving a thermoplastic resin and liquid crystal in a solvent; and

evaporating said solvent while phase separating said liquid crystal to spontaneously form microdroplets of liquid crystal dispersed in a hardened resin matrix.

4,685,772

TUNABLE ACOUSTO-OPTIC FILTER WITH IMPROVED SPECTRAL RESOLUTION AND INCREASED APERTURE

I-Cheng Chang, Sunnyvale, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Continuation-in-part of Ser. No. 452,603, Dec. 23, 1982, abandoned. This application Apr. 26, 1985, Ser. No. 727,507

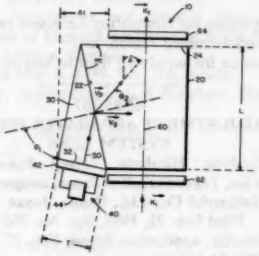
Int. Cl.[4] G02F *1/11*

U.S. Cl. 350—372 **8 Claims**

1. A tunable acousto-optic filter assembly having reduced optical dead space and transducer size, for use with a beam of polarized light transmitted therethrough in a predetermined direction, said assembly comprising:

a. an acoustically anistropic, optically birefringent, crystal prism member which operates on the principle of acousto-optic diffraction wherein the tangents to the locus of incident and diffracted light wave vectors are parallel, said crystal prism member having a first face through which said light beam enters, a second face through which said light beam exits, and a third face of predetermined angular orientation with respect to said second face;

b. an acoustic prism coupler member, made of a material of low acoustic velocity, in abutting contact with said third face of said crystal prism member; and



c. means, including an acoustical transducer, operably associated with said acoustic prism coupler member for generating an acoustic wave in said coupler member and in said crystal prism member such that said acoustic wave is transmitted through said third face of said crystal prism member such that the group velocity of said generated acoustic wave travels in said crystal prism member in a direction perpendicular to said predetermined direction of said light beam, and said acoustic wave and said light beam meet and interact within said crystal prism member, whereby said optical dead space and said transducer size of said filter assembly are thereby substantially reduced.

4,685,773

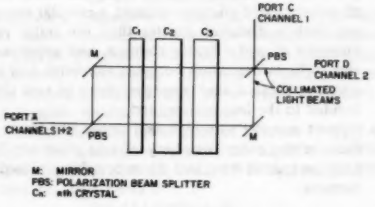
BIREFRINGENT OPTICAL MULTIPLEXER WITH FLATTENED BANDPASS

W. John Carlsen, Boston, and Paul Melman, Newton, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Continuation-in-part of Ser. No. 650,012, Sep. 13, 1984, Pat. No. 4,566,761. This application Oct. 28, 1985, Ser. No. 791,820

Int. Cl.[4] G02B *5/30*; H04J *1/08*

U.S. Cl. 350—401 **7 Claims**



1. A birefringent optical wavelength multiplexer/demultiplexer comprising

first polarization beam splitting means for splitting an applied collimated beam of light into a first pair of linearly polarized beams whose directions of propagation are perpendicular to one another;

first reflecting means for reflecting one of said linearly polarized beams parallel to the other polarized beam;

a plurality of birefringent elements, each said element having a pair of opposed surfaces, one of said surfaces of one of said elements being parallel to and in adjacent relationship with another of said elements, each of said elements having a respective optical axis oriented nominally parallel to said surfaces of the respective element, said elements being oriented with said parallel surfaces perpendicular to the direction of propagation of said linearly polarized beams, said respective optical axis being oriented at specific angles with respect to said first polarization beam splitting means,

one electric field component of each of the two beams incident upon an element being parallel to the "extraordinary" axis of that element and propagating at different velocity, dependent upon the material of that element, from the other electric field component which is parallel to the "ordinary" axis of that element;

said plurality of birefringent elements being so oriented that each element introduces an additional sinusoidal component to the transfer function of the device, tending to effectuate a flattened transfer function;

second reflecting means for reflecting the other of said linearly polarized beams, following propagation of said other beam through said elements, in a direction perpendicular to that of said one of said polarized beams following propagation of said one polarized beam through said elements; and

second polarization beam splitting means oriented to receive both said reflected other beam and the propagated one beam, wherein

(1) when the propagated other beam and the propagated one beam have polarization states which are linearly polarized parallel to the polarization directions of said respective first pair of polarized beams, said reflected other beam is transmitted by said second polarization beam splitting means, and said propagated one beam is reflected by said second polarization beam splitting means, whereby said reflected other beam and said propagated one beam are combined and transmitted outwardly from a first port; and

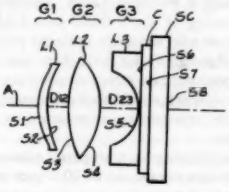
(2) when the propagated other beam and the propagated one beam have polarization states which are linearly polarized perpendicular to the polarization directions of said respective first pair of polarized beams, said reflected other beam is reflected by said second polarization beam splitting means, and said propagated one beam is transmitted by said second polarization beam splitting means, whereby said reflected other beam and said propagated one beam are combined and transmitted outwardly from a second port.

4,685,774

PROJECTION LENS

Jacob Moskovich, Cincinnati, Ohio, assignor to U.S. Precision Lens, Incorporated, Cincinnati, Ohio

Filed Jan. 17, 1986, Ser. No. 820,553
Int. Cl.[4] G02B *13/18, 1/06, 9/12, 9/34*
U.S. Cl. 350—432 **60 Claims**



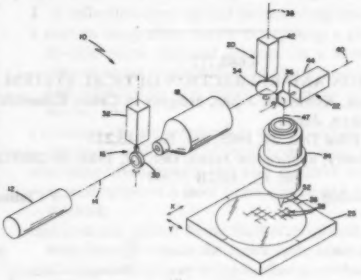
46. A projection lens consisting from the image end of a first lens unit consisting of a generally meniscus shaped element having an aspheric image side surface which is convex to the image and adjacent the optical axis of the lens but changes to concave to the image adjacent the clear aperture thereof, a second positive lens unit consisting of a single biconvex element providing the majority of the positive power of said projection lens, a third negative lens unit having a concave image side surface and contributing to correction of field curvature, and a corrector lens element of weak optical power having an aspheric surface positioned between said second and third lens units, said element of said first lens unit having positive optical power at the axis thereof and negative optical power adjacent the clear aperture thereof, said concave image side surface of said third lens unit being spherical.

4,685,775

LIGHT BEAM POSITIONING APPARATUS

Frederick A. Goodman, Brookline, and Antonios E. Prentakis, Cambridge, both of Mass., assignors to Teradyne, Inc., Boston, Mass.

Filed Nov. 15, 1985, Ser. No. 798,584
Int. Cl.[4] G02B *26/08*
U.S. Cl. 350—486 **9 Claims**



1. Apparatus for pivoting a light beam about an axis to a remote point, said apparatus comprising

translation means for laterally translating said light beam,

a first reflector positioned to receive said light beam from said translation means and pivotally mounted about a first axis so as to reflect said light beam at varying angles from the path of said beam from said translation means, depending on the pivotal position of said first reflector, and

control means responsive to said pivotal position of said first reflector for automatically causing said translation means to laterally translate said path of said light beam the amount necessary to cause said light beam from said first reflector to be reflected to a fixed remote point, regardless of said pivotal position of said first reflector.

4,685,776

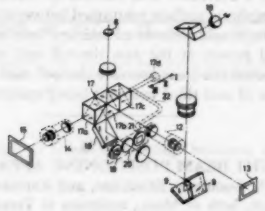
INVERTED-DESIGN OPTICAL MICROSCOPE

Yasuo Inoue; Ken Yonekubo, both of Hachiouji; Masaaki Yamagishi, Ina, and Itaru Endo, Hachiouji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 5, 1984, Ser. No. 647,438
Claims priority, application Japan, Sep. 5, 1983, 58-162949
Int. Cl.[4] G02B *21/36, 23/00*
U.S. Cl. 350—502 **2 Claims**

1. An inverted design optical microscope comprising a first optical means reflecting a part of light from an object to be inspected and passing the rest of the light, an observing optical system arranged in association with said first optical means, a plurality of photographing optical systems arranged in association with said first optical means, and a second optical means arranged below said first optical means and reflecting the light having passed through said first optical means, said first optical means including a plurality of members, one of which has a

transmission factor of 100% and the others of which have a reflection factor of 60 to 90% and a transmission factor of 10 to 40%, held integrally to each other and capable of being alternatively switched to be inserted into an observing light path and any one of a plurality of photographing light paths by an



operating handle, said light having passed through said first optical means being led to the observing light path through said second optical means and said light reflected by said first optical means being led to any one of the photographing light paths.

4,685,777

REFLECTION AND REFRACTION OPTICAL SYSTEM

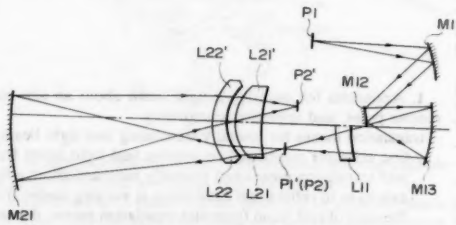
Ryusho Hirose, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 24, 1985, Ser. No. 813,223

Claims priority, application Japan, Dec. 27, 1984, 59-280573

Int. Cl.[4] G02B *17/08*

U.S. Cl. 350—505 **7 Claims**



1. An off-axis imaging optical system, comprising:

a first imaging optical system including a reflection optical element and a refraction optical element;

a second imaging optical system including a reflection optical element and a refraction optical element, wherein said second imaging optical system is disposed with respect to said first imaging optical system so as to reimage an image formed by said first imaging optical system; and

wherein at least one of said optical elements has its working surface off a common optical axis of other optical elements

wherein one of said first and second imaging optical systems has unit magnification or enlarging magnification imaging power, and the other imaging optical system has a reducing magnification imaging power, so as to provide a reducing magnification power as a whole.

4,685,778

PROCESS FOR NUCLEAR HARDENING OPTICS AND PRODUCT PRODUCED THEREBY

David B. Pollock, 13026 Percivale Dr., Huntsville, Ala. 35803

Filed May 12, 1986, Ser. No. 861,962

Int. Cl.[4] G02B *5/08, 23/24;* **B22D** *11/126;* **B23P** *15/26*

U.S. Cl. 350—600 **2 Claims**

1. A process for nuclear hardening an optical part consisting of a prepared beryllium substrate processed by the procedures and processes defined under A through D set forth below, said substrate serving as a support for a vapor deposited beryllium coating processed by the procedures and precision processes defined under E set forth below to yield a first surface mirror which is dense, defect-free, and capable of withstanding exposure to highly energetic photons, said process comprising:

A. selecting a subtrate material of high purity beryllium from a grade of high purity beryllium selected from instrument grade, optical grade, or structural grade or the equivalent grade of beryllium having a Brush-Wellman designation, said high purity beryllium functioning as a substrate for a vapor deposited coating of beryllium after being machined and finished to a surface finish of 125 micro-inch rms;

B. Machining said substrate material by a machining process to minimize machine damage and residual stresses, said machining process comprising:

a. rough machining said substrate material to within 0.05 inch of final dimensions;

b. stress relieving said machined substrate material by heating to a temperature of about 650° C.±50° C. in a vacuum and maintaining said temperature for about four hours;

c. cooling said substrate material at a rate equal to or less than about 100° C. per hour above 300° C., said cooling performed in a vacuum or dry-nitrogen atmosphere;

d. completing a final machining of said substrate material to within 0.002 inch to 0.003 inch by successively removing layers of 0.020 inch, 0.020 inch, and 0.007 inch from said substrate material to perfect a surface finish of 125 micro-inch rms or better;

C. Processing and annealing said final machined substrate material by first heating to about 800° C.+20° C. in a vacuum of 10^{-5}torr or less pressure for a time period of about two hours±0.25 hour and then cooling at a rate of less than about 100° C. per hour above 300° C. temperature followed by cooling below 300° C. in a vacuum, air or dry nitrogen atmosphere;

D. Completing a degreasing, cleaning and etching process on said final machined substrate material which comprises:

a. vapor degreasing with 1,1,1 trichloroethane;

b. mild alkaline cleaning and rinsing by first immersing in a mild alkaline solution prepared by adding 7 ±2 oz of a mild alkaline cleaning compound per gallon of deionized water followed by rinsing in deionized water;

c. etching in a nitric acid, sulfuric acid, and hydrofluoric acid solution containing by volume 2% nitric acid, 2% sulfuric and 1½% hydrofluoric in deionized water followed by rinsing in deionized water and drying in clean dry air;

d. completing precision machining of holes, threads and lap precision surfaces by removing up to about 0.005 inch of stock; and

e. cleaning by vapor degreasing and subsequently wiping of surfaces using reagent grade acetone, freon, or isopropanol and blow drying;

E. Completing a physical vapor depositing procedure to yield a coating of about 0.012 inch±0.002 inch thick of beryllium on said substrate material processed as defined under A through D set forth hereinabove, said physical vapor depositing procedure comprising:

a. heating said prepared substrate material to 250° C.±25° C. while maintaining a pressure at or below about 10^{-4}torr;

b. continue heating said prepared substrate material until pressure has decreased to 10^{-5}torr and then continue heating said prepared substrate material to a temperature of about 520° C.±25° C. and maintaining this temperature until the pressure remains below 10^{-5}torr;

c. sputter etching said prepared substrate material of a power level greater than three watt-hours per square

inch of surface area with an argon gas pressure of 10^{-3} to 10^{31} ^{4}torr;

d. heating said sputter etched substrate to 420° C.±20° C. and then initiate substrate rotation from about one to about 20 revolutions per minute as required to achieve a 10% thickness uniformity during a vapor deposition rate of beryllium controlled at a deposition rate of about $12\pm10\times10^{-5}$ inches per minute;

e. cooling said vapor deposited coating and said prepared substrate material at a rate of about 100° C. per hour until 300° C. is reached and then complete cooling in a vacuum or dry nitrogen atmosphere;

f. thermally processing the coated, prepared substrate by immersing it in liquid nitrogen gas at −190° C.±20° C. for a minimum time of about 30 minutes and then allowing the coated, prepared substrate to warm to about 95° C. in warmed, dried air for about 15 minutes minimum;

g. repeating said thermal processing to complete three complete warm-cold-warm cycles; and,

h. completing a grinding, and polishing procedure using low-scatter optical polishing procedures as for bare beryllium to complete said process for nuclear hardening an optical part consisting of a first surface mirror of beryllium on a prepared substrate of beryllium, said first surface mirror being dense, defect-free, and capable of withstanding exposure to highly energetic photons.

2. A nuclear hardened optical part in the form of lows-catter, first surface mirror on a prepared substrate of beryllium, said prepared substrate surface having a surface finish of at least 125 micro-inch rms prepared by the process defined by the steps A through D of claim 1 prior to receiving a vapor deposited coating of about 0.012 inch ±0.002 inch thick of beryllium completed by vapor depositing, thermally processing, grinding, and polishing by the process defined by the steps of E of claim 1.

4,685,779

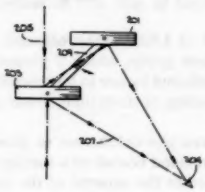
COMBINED FORWARD AND REARWARD VIEWING MIRROR ASSEMBLY FOR AUTOMOTIVE VEHICLES

Sergio González, Garza García, Mexico, assignor to Kasos N.V., San Antonio, Tex.

Filed Apr. 28, 1986, Ser. No. 856,940

Int. Cl.^{4} G02B *7/18;* B60R *1/10*

U.S. Cl. 350—604 **16 Claims**



1. A combination forward and rearward viewing mirror assembly for an automotive vehicle, comprising:

a first body attachable to an outer surface of the vehicle;

a first mirror mounted to said first body;

a second body;

coupling means including a lever system connected to said first body and to said second body for supporting said second body on said first body and for shifting said second body from a retracted position adjacent to said first body to an extended position remote from said first body;

a second mirror on a first side of said second body, said first mirror and said second mirror having relative positions and orientations in said extended position of said second body so that an operator of said vehicle looking at said first mirror can obtain via said first mirror and said second mirror an enhanced view of objects forward of said vehicle; and

a third mirror on a second side of said second body substantially opposed to said first side, said third mirror being viewable both in said retracted position and said extended position of said second body by an operator of said vehicle for enabling monitoring of objects towards and beyond a rear end of said vehicle.

4,685,780

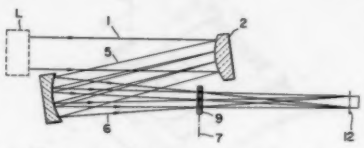
REFLECTION TYPE OPTICAL DEVICE

Seiichirou Kimura, Koganei, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 11, 1986, Ser. No. 838,620

Int. Cl.^{4} G02B *17/06, 5/10;* B23K *27/00*

U.S. Cl. 350—613 **8 Claims**



1. A reflection-type optical device comprising:

a convex integration mirror comprising a plurality of side-by-side plane segment mirrors on a material having a convex outer configuration so that a laser beam is divided and reflected by said integration mirror as reflected laser beams; and

a concave mirror arranged to condense said reflected laser beams on a plurality of focal points lying on one plane,

said integration mirror and said concave mirror being arranged between a laser beam source and a material to be worked,

said concave mirror being further provided with a central hole through which the entire laser beam passes,

said integration mirror being further provided with a central hole axially aligned with said hole of the concave mirror to pass a part of the entire laser beam,

said integration mirror and said concave mirror being arranged at positions at which laser beams divided and reflected by said integration mirror are received by said concave mirror, the received laser beams being then reflected thereon to superimpose said laser beams reflected by said concave mirror on the laser beam directly passing through said integration mirror on a surface of the material to be worked.

4,685,781

SPECTACLES WITH FASTENING DEVICE

Helmut Wiedmann, Heilbronn, and Gunther Czech, Filderstadt, both, Fed. Rep. of Germany, assignors to Simro AG, Chur, Switzerland

Filed Nov. 20, 1984, Ser. No. 873,518

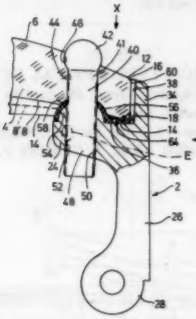
Claims priority, application Fed. Rep. of Germany, Aug. 7, 1984, 3429071

Int. Cl.^{4} G02C *1/02*

U.S. Cl. 351—110 **28 Claims**

1. A fastening device for connecting a spectacle lens having a borehole with an enlarged seat at each end thereof to an individual component in the form of a bridge, a flange or a temple articulation piece of a spectacle frame, said fastening device comprising a pin adapted to extend through the borehole, a connecting element on one end of the pin adapted to rest in one of the seats at one of the two borehole ends, a lock for preventing the individual component from rotating around the axis of the pin relative to the lens; said pin being connectable at its other end to a shank portion of the individual component arranged to extend approximately parallel to the lens; a first protrusion on said shank arranged to extend toward the lens and adapted to rest in the second borehole seat for clamping the lens between said connecting element and said first

protrusion on the shank and said lock further having means on the individual component adapted to engage with the edge of the lens near said borehole at locations spaced from one another in the peripheral direction of the lens and being situated on opposite sides of a point on the lens edge located closest to the borehole.



4,685,782

SPECTACLES HAVING A DETACHABLE FRONT

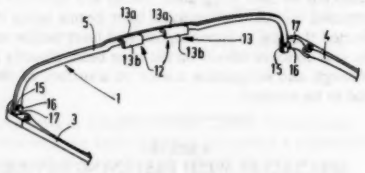
Bernard Lhospice, Blois, France, assignor to Essilor International (Compagnie Generale d'Optique), Creteil Cedex, France

Continuation of Ser. No. 592,913, Mar. 23, 1984, abandoned. This application Aug. 29, 1986, Ser. No. 903,859

Claims priority, application France, Apr. 8, 1983, 83 05761; Aug. 10, 1983, 83 13170

Int. Cl.⁴ G02C *3/02*

U.S. Cl. 351—130 **11 Claims**



1. A disassemblable spectacle frame comprising a support frame comprising a central support means supporting a first connecting means, and two secured second connecting means located near the lateral ends of the support frame adjacent to a hinge means between the support frame and a temple; a lens frame engageable with the support frame, comprising two lens holding elements, a median element connected between the two lens holding elements and stud means, with an enlarged terminal portion, arranged to engage the second connecting means of the support frame, the first connecting means comprising at least one open channel element adapted to receive the median element of the lens frame, the second connecting means comprising a housing, having an opening open at an end for receiving the stud means, the open end facing a direction opposite to the direction of the opening of the channel element wherein the first and second connecting means being adapted to urgingly engage the first connecting means with the median element and the second connecting means with the stud means through relative deformation of the support frame and the lens frame.

4,685,783

POLYCHROMIC TETRACYCLO-SPIRO-ADAMATYLIDENE DERIVATIVES, AND POLYCHROMIC LENS INCORPORATING SAID COMPOUNDS

Harold H. Heller, Cardiff; Stephen N. Oliver; John Whittal, both of Mid-Glamorgan, all of United Kingdom; William Johncock, Geneva, Switzerland; Paul J. Darcy, Aberystwyth, and Clive Trundle, Towcester, both of United Kingdom, assignors to The Plessey Company P.L.C., Essex, England

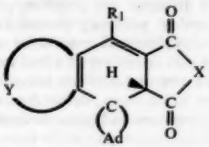
Continuation-in-part of Ser. No. 530,161, Sep. 7, 1983, abandoned. This application Sep. 5, 1984, Ser. No. 647,565

The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.

Int. Cl.⁴ C07D *307/60, 405/06;* C09K *9/00;* G03C *1/733*

U.S. Cl. 351—163 **7 Claims**

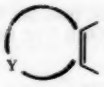
1. A compound having the following general formula:



(I)

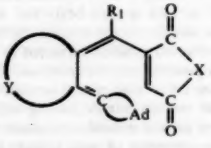
represents an adamantylidene; R_1 represents hydrogen, lower alkyl, phenyl or phenyl alkyl;

X represents oxygen or $>NR_2$, in which R_2 is hydrogen, lower alkyl, phenyl or phenyl alkyl and



is a 2,5-, 2,4- or 3,5-dimethoxybenzo, a 2- or 3-furano, or a 2- or 3-thiopheno group, which Y groups are unsubstituted or may be substituted by one to four members selected from the group consisting of deuterium, lower alkyl, nitro, halogen, or phenyl.

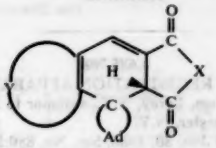
5. A photoreactive ophthalmic or plano lens having a heliochromic compound coated on a surface thereof or laminated or incorporated in the material of the lens, the heliochromic compound having the property of reversibly forming a coloured structural form on irradiation with U.V. light and returning to a colourless or paler structural form at normal ambient temperature in the absence of U.V. stimulation, the coloured form having the following structure (a)



(a)

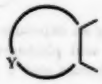
-continued

(b)



and being capable of conversion to its colourless or paler form (b) by formation of a central 6-membered ring, wherein

represents an adamentylidene; R_1 represents hydrogen, lower alkyl, phenyl, or phenyl alkyl; X represents oxygen or $>NR_2$, in which R_2 is hydrogen, lower alkyl, phenyl or phenyl alkyl and



is a 2,5-, 2,4- or 3,5-dimethoxybenzo, a 2- or 3-furano, or a 2- or 3-thiopheno group, which Y groups are unsubstituted or may be substituted by one to four members selected from the group consisting of deuterium, lower alkyl, nitro, halogen, or phenyl.

4,685,784

METHOD FOR CONTROLLING FIXATION OF A PATIENT'S EYE DURING PERIMETER MEASUREMENTS

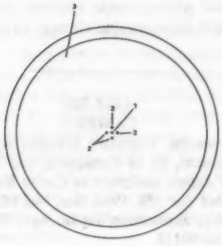
Rainer Kirchhuebel, Wetzlar, Fed. Rep. of Germany, assignor to Oculus Optikgeraete GmbH, Wetzlar, Fed. Rep. of Germany

Filed Sep. 18, 1985, Ser. No. 777,399

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1984, 3434319

Int. Cl.[4] A61B *3/02*

U.S. Cl. 351—226 **3 Claims**



1. In a method for controlling the fixation of the eye of a patient during a measuring of the sensitivity of the retina of the eye using a perimeter device in which a plurality of spaced testing light points of adjustable brightness are visible to the eye of the patient, the improvement comprising the steps of adjusting a central testing light point, to be fixated upon by the patient, to a threshold value of the center of the eye of the patient and thereafter repeatedly illuminating this testing light point with the threshold value or a superthreshold value near the threshold (1–4 dB superthreshold) to facilitate control of the fixation during the entire examination.

4,685,785

INTEGRAL PLASTIC FRAME FOR HOLDING A FILM SLIDE

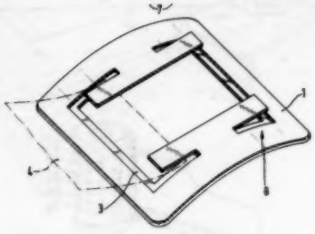
Peter Mundt, Garmisch-Partenkirchen; Arnold Neubold, Farchant, and Claus Pohl, Eschenlohe, all of Fed. Rep. of Germany, assignors to Geimuplast Peter Mundt GmbH. & Co. KG., Farchant, Fed. Rep. of Germany

Filed Dec. 30, 1985, Ser. No. 814,258

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1985, 3501425

Int. Cl.[4] G03B *21/64*

U.S. Cl. 353—120 **3 Claims**



1. A frame for holding a film slide, said frame comprising:

a frame body,

a central window defined by said frame body,

two recessed bearing surfaces substantially surrounding said window for contacting the film slide when the film slide is inserted into said window,

two webs, each web being attached at one end to a respective one of two mutually opposite sides of said window and extending substantially perpendicular to a direction of insertion of the film slide into said window, said webs being located over respective gaps defined between opposed ends of said two recessed bearing surfaces, and

two retaining strips, each retaining strip being

attached at the other end of a respective one of said webs and extending substantially parallel to the direction of insertion of the film slide into said window,

said webs and said retaining strips extending into said window beyond said recessed bearing surfaces and said gaps so that only one side of the film slide is held at any point by one of said recessed bearing surfaces, said webs and said retaining strips,

said frame body being sufficiently flexible so that edges of the film strip are allowed to be guided through track grooves defined by said webs and portions of said recessed bearing surfaces extending parallel to said retaining strips so that when said frame body is placed in a temporarily deformed state, the film strip is guided along said track grooves, and is reliably held between said retaining strips and said bearing surfaces to cover said window upon return of said frame body from the temporarily deformed state.

4,685,786

EXPOSURE CONTROL DEVICE FOR CAMERA

Yoshikazu Iida, Chigasaki, and Kenji Ishizuki, Tokyo, both of Japan, assignors to Nippon Kogaku K. K., Tokyo, Japan

Filed Mar. 31, 1986, Ser. No. 846,235

Claims priority, application Japan, Apr. 15, 1985, 60-79769

Int. Cl.[4] G03B *7/24, 7/099*

U.S. Cl. 354—21 **5 Claims**

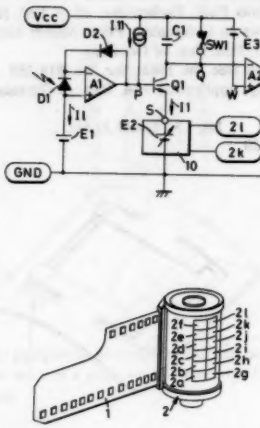
1. An exposure control device for a camera comprising:

a photo-detector for detecting a light which passes through an imaging lens and is reflected by a film surface;

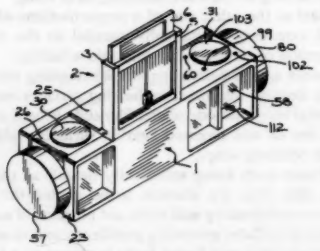
control means for controlling exposure of the film in accordance with the output of said photo-detector;

read means for reading information on a film latitude from the film or a cartridge in which the film is accommodated; and

correction means for correcting the exposure controlled by said control means by determining a reflection coefficient of the film loaded in the camera based on the information of the latitude read by said read means.

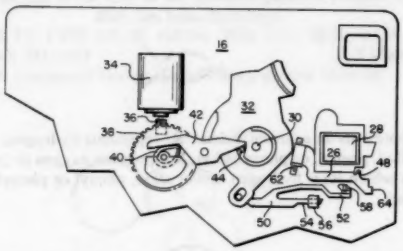


4,685,787
CAMERA
Wolcott Kinnard, 2564 N. 124th St., Apt. 407, Milwaukee, Wis. 53226
Filed Dec. 23, 1985, Ser. No. 812,271
Int. Cl.[4] G03B *17/50, 35/08, 13/02, 17/38*
U.S. Cl. 354—83 **16 Claims**



1. A camera comprising a first chamber and a second chamber with means to attach and detach said first chamber and said second chamber from each other, with said first chamber comprising means to make a photographic exposure on sensitized film, and said second chamber containing a film sensitized to produce a negative in a diffusion-transfer-reversal photographic process and containing a slide mount with a transparent base therein, with a positive image receiving surface for said diffusion-transfer-reversal process, which can be adhered to said transparent base, and with a means to spread under pressure the requisite liquid chemicals for said diffusion-transfer-reversal process, a means to transport said film sensitized to produce a negative image into said first chamber, a means to withdraw said film back into said second chamber, a means to withdraw from said second chamber said film sensitized to produce a negative image together with said slide mount and said positive image receiving surface, and with a means to apply pressure by said withdrawal to spread said requisite liquid chamicals between said film sensitized to produce a negative image and said positive receiving image on said transparent base and said slide mount, thus effecting completion within a requisite time period of said diffusion-transfer-reversal process.

4,685,788
FILM REGISTRATION APPARATUS
William L. Burnham, Leroy, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.
Filed Jun. 30, 1986, Ser. No. 880,533
Int. Cl.[4] G03B *1/00*
U.S. Cl. 354—121 **7 Claims**



1. In a camera having an exposure aperture for exposing a photographic element, said photographic element having a plurality of exposure frames and a plurality of registration perforations arranged in a predetermined relationship one with each frame, means for moving each frame of said photographic element to said exposure aperture, means for registering each frame of said photographic element at said exposure aperture, and means for holding said photographic element in a predetermined plane at said exposure aperture, the improvement wherein:

said frame registering means includes a fixed element disposed in said camera adjacent said exposure aperture and in a similar predetermined relationship therewith as said registration perforations are to said exposure frames of said photographic element, said fixed element arranged to extend into the predetermined plane of the photographic element and to engage said registration perforation to hold said frame in registration with said exposure aperture, and a movable element arranged to engage the photographic element to move said photographic element out of said predetermined plane to disengage said registration perforation from said fixed element whereby said means for moving said photographic element can move the next frame of said photographic element to said exposure aperture.

4,685,789
CAMERA
Masaharu Kawamura; Yoshihito Harada; Ryuichi Kobayashi; Masayoshi Kiuchi, all of Kanagawa, and Kenichiro Amano, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha
Filed Apr. 24, 1986, Ser. No. 855,799
Claims priority, application Japan, Apr. 26, 1985, 60-90117; Apr. 26, 1985, 60-90118
Int. Cl.[4] G03B *1/12*
U.S. Cl. 354—173.11 **9 Claims**

1. An electrical power source voltage detecting device for a camera having an operation control mechanism, comprising:

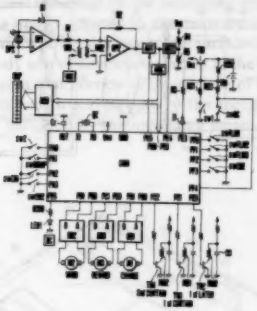
(a) a motor capable of rotating forward and backward;

(b) an electrical power source circuit for supplying voltage to said motor so that said motor works;

(c) a drive transmission system arranged upon said forward rotation to transmit the driving torque of said motor to said operation control mechanism and upon backward rotation to hinder the transmission of the driving torque;

(d) detecting means for detecting the level of said voltage

with the use of said motor as a load when said motor rotates backward; and



(e) a control circuit for causing the backward operation of said motor by said electrical power source circuit and the operation of said detecting means.

4,685,790

FILM GUIDE DEVICE IN A CAMERA

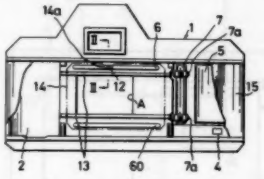
Kimio Uematsu, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Jul. 28, 1986, Ser. No. 889,790

Claims priority, application Japan, Aug. 7, 1985, 60-121096[U]

Int. Cl.[4] G03B *1/48, 17/28*

U.S. Cl. 354—203 **6 Claims**



1. In a camera provided with an openable and closable back lid, and a film easy load device for automatically taking up around a take-up spool a film leader portion drawn out of a film cartridge loaded into a film supply chamber, said film leader portion being formed by partially cutting away one side edge of said film, a film guide device comprising:

a pair of guide rails including a first rail in contact with said one side edge of the film and a second rail in contact with the other side edge of the film, said guide rails extending in the film feeding direction and forming a film passage channel therebetween;

film departure preventing means projected from the substantially central position of said first rail toward said back lid and preventing said one side edge of said film in a state in which said leader portion is in contact with said take-up spool from departing outwardly from said passage channel; and

a film pressure plate having an escape portion at a location corresponding to said film departure preventing means and adapted to contact the upper surfaces of both of said pair of rails when said back lid is closed, thereby maintaining the degree of planarity of the film in said passage channel.

4,685,791

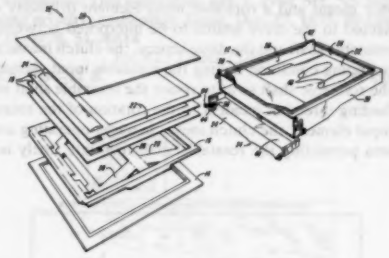
FILM CASSETTE

Timothy F. Falzone, Revere, and Anthony J. Schettino, Arlington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 21, 1986, Ser. No. 820,020

Int. Cl.[4] G03B *17/26*

U.S. Cl. 354—277 **5 Claims**



1. A film cassette of the type usable as part of a film pack for storing a stack of film units of the self-developing type usable with a photographic apparatus, said cassette comprising:

a housing defining an open end;

first means hingedly attached to said housing and movable to a closed position for closing said open end so as to define in cooperation with said housing an exit slot in operative relationship to each successive topmost film unit of the stack, said slot having a vertical clearance which allows ejection of only single units, said first means including biasing means;

second means including a camming projection on and offset laterally from each side wall of said housing for mechanically coupling said first means to said housing, and a reference surface on and offset laterally from each of said side walls;

said biasing means for biasing said first means into contact with said reference surfaces when said first means is in said closed position so as to insure establishing said clearance; and,

said reference surfaces, said first means and said camming projections providing labyrinth light seals inhibiting actinic radiation from leaking therepast into said housing.

4,685,792

COPYING PAPER FEED DEVICE FOR AN ELECTROSTATIC COPYING APPARATUS

Masahide Iseki, Neyagawa; Toshio Yoshiyama, Sakai; Hiroshi Kajita, Kobe; Masanori Itakiyo, Sakai; Hiroshi Kusumoto, Takaishi; Yoshizo Kawamori, Fujiidera, and Masuo Kawamoto, Daito, all of Japan, assignors to Mita Industrial Co., Ltd., Japan

Division of Ser. No. 551,794, Nov. 15, 1983, Pat. No. 4,555,173. This application Sep. 4, 1985, Ser. No. 772,487

Claims priority, application Japan, Nov. 30, 1982, 57-209849

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—3 SH **4 Claims**

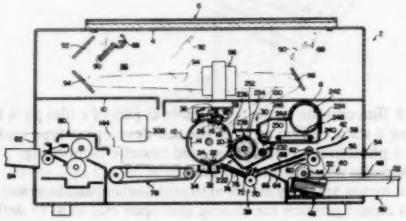
1. A copying paper feed device for an electrostatic copying apparatus, said device comprising:

a copying paper cassette receiving section adapted for loading thereinto of a copying paper cassette having a box like cassette case with an upper surface, a front end, a bottom plate disposed within the cassette case on which to place a layer of copying paper sheets, and spring means for elastically biasing the front end portion of the bottom plate upwardly, the cassette case being open at least at the front end portion of the upper surface, the loading of the cassette into the cassette receiving section being by inserting at least the front end portion of the cassette into the cassette receiving section;

a shaft rotatably mounted within the cassette receiving section and adapted to be drivingly connected to a drive source;

a feed roller mounted on the rotatable shaft so that when a copying paper cassette is properly loaded into the cassette-receiving section, the front end portion of the uppermost copying paper sheet of the copying paper sheet layer is brought into press contact with the feed roller by the elastic biasing action of the spring member; and

clutch means and a rotatable input element drivingly connected to the drive source to be interposed between the rotatable shaft and the drive source, the clutch means in an operating condition linking the rotatable input element to the rotatable shaft so as to rotate the rotatable shaft in the feeding direction incident to the rotation of the rotatable input element, the clutch means in a non-operating condition permitting the rotatable shaft to rotate freely in the



feeding direction and in a direction opposite to the feeding direction with respect to the rotatable input element, the clutch means comprising a second rotatable element, a coil spring received about a hub portion of the rotatable input element and a hub portion of the rotatable shaft and wrapped from its one end connected to the rotatable input element to its other end connected to the second rotatable element in a direction in which the coil spring is shrunken when the rotatable input element is rotated in the feeding direction relative to the second rotatable element, a friction member mounted for free movement between an operating position at which the friction member frictionally contacts the second rotatable element to resist the rotation of the second rotatable element and a non-operating position at which the friction member is isolated from the second rotatable element, and control means for selectively positioning the friction member at one of the operating position and the non-operating position.

4,685,793

IMAGE FORMING APPARATUS

Takamasa Sawada, Kawasaki, and Junji Ihikawa, Kamakura, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 757,458, Jul. 22, 1985, abandoned. This application Sep. 23, 1986, Ser. No. 910,838

Claims priority, application Japan, Jul. 26, 1984, 59-157889

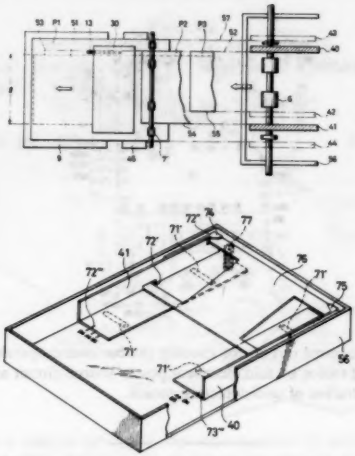
Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—3 SH **7 Claims**

1. An image forming apparatus comprising: image forming means for forming an image on a sheet material;

means for conveying the sheet material to said image forming means; and

guide means for guiding sheet materials with reference to one side reference position when sheet materials of sizes smaller than a predetermined size are to be conveyed and for guiding sheet materials with reference to a reference position shifted from the one side reference position when



sheet materials of a size larger than the predetermined size are to be conveyed.

4,685,794

IMAGE FORMING APPARATUS

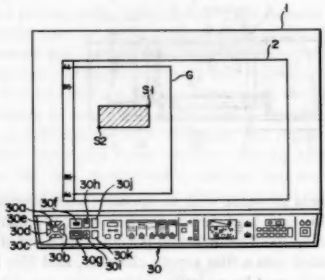
Junji Watanabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 13, 1985, Ser. No. 776,134

Claims priority, application Japan, Sep. 14, 1984, 59-193224

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—7 **9 Claims**



1. An image forming apparatus comprising:

a photosensitive body holding an electric charge on the surface thereof;

charging means for uniformly applying electric charge to the surface of the photosensitive body;

an original table adapted to carry an original thereon;

image exposure means for exposing the surface of the photosensitive body uniformly charged by the charging means to a light representing an image of the original on the original table, thereby forming an electric charge pattern responsive to the original image on the surface of the photosensitive body;

indicating means for indicating a specific range of the original on the original table, said indicating means including light emitting means for applying a spot light to the original on the original table from under the same, so that the perimeter of the specific range is defined by moving the spot light;

erasing means for erasing the electric charge on the portion of the surface of the photosensitive body other than that surface portion which corresponds to the specific range of the original indicated by the indicating means; and

developing means adapted to alternatively supply developing agents of different types to the surface of the photosensitive body and to develop by means of the supplied developing agent that portion of the surface of the photosensitive body which corresponds to the specific range of the original indicated by the indicating means.

4,685,795

DOCUMENT SCANNING APPARATUS

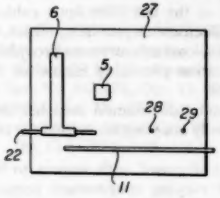
Tsuyoshi Yoshimura, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 11, 1986, Ser. No. 850,822

Claims priority, application Japan, May 2, 1985, 60-94649

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—8 **18 Claims**



1. A document scanning apparatus comprising:

a light source for illuminating an original document to be copied with an elongated light beam defining a longitudinal axis;

first and second optical scanner systems coupled optically in series for transmitting an image of an original to a predetermined location, said light source mechanically coupled to said first optical scanner system;

a lens defining an optical axis and supported on a lens support member, said first and second optical scanner systems transmitting an image transmitted to said lens;

means for aligning said lens and said first and second optical scanner systems, comprising,

first means for defining a first reference point on said lens support member,

second means for defining a second reference point on said lens support member,

third means for defining a third reference point on said first optical scanner system,

fourth means for defining a fourth reference point on said second optical scanner system;

wherein when said first reference point is aligned with said third reference point and second second reference point is aligned with said fourth reference point, said first and second optical scanner systems are aligned with said lens.

4,685,796

APPARATUS FOR CONTROLLING IMAGE FORMATION

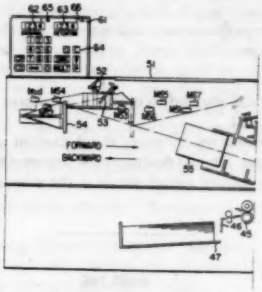
Katsuichi Shimizu, Hoya; Hisashi Sakamaki; Katsushi Furuichi, both of Yokohama, and Toshio Honma, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 182,087, Aug. 28, 1980, abandoned, which is a division of Ser. No. 964,023, Nov. 27, 1978, Pat. No. 4,305,654, which is a continuation of Ser. No. 752,895, Dec. 21, 1976, abandoned. This application Jan. 6, 1984, Ser. No. 568,631

Claims priority, application Japan, Dec. 27, 1975, 50-156671; Mar. 31, 1976, 51-36614

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—14 R **11 Claims**



1. A copying or printing machine comprising a recording medium; actuatable elements, including scanning means, for forming an image on said recording medium; key input means for setting data or instructing a copy operation; and control means including a read-only memory having stored programs for controlling actuations of said elements; wherein the programs stored in said read-only memory include a key entry program for entry of inputs from said key input means and a positioning program for determining whether or not said scanning means is in a predetermined position and for permitting said scanning means to be set to the predetermined position prior to an image formation; wherein said control means moves said scanning means to the predetermined position in response to the positioning program when said scanning means is not in the predetermined position after the entry of the key inputs by the entry program, and enables a copying operation when said scanning means is set in the predetermined position, said control means executing said key entry program after the machine starts, and executing the positioning program before the start of said scanning means and after the entry of said key input means; and wherein said control means executes said positioning program in response to the entry of said key input means and moves said scanning means to a predetermined position after the supply of power to said machine.

4,685,797

COPYING MACHINE CONTROL SYSTEM

Masazumi Ito, Toyohashi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Sep. 20, 1985, Ser. No. 778,507

Claims priority, application Japan, Sep. 21, 1984, 59-199021; Aug. 1, 1985, 60-170307

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—14 SH **12 Claims**

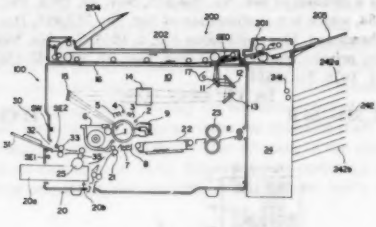
1. A control system for a copying machine operable in a plurality of paper feed modes, comprising:

manual feed mode changeover means for switching to a manual paper feed mode which is one of the plurality of paper feed modes;

manual paper feed means for feeding copying papers;

document conveyor means for transporting an original document to an exposure position and discharging the original document from the exposure position;

switch means disposed adjacent to the manual paper feed



means and adapted to output a document change request signal; and

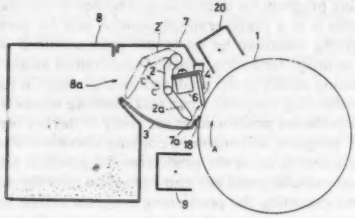
control means for actuating the document conveyor means to change original documents in response to the document change request signal output in the manual feed mode.

4,685,798

CLEANER FOR AN ELECTROPHOTOGRAPHIC COPYING MACHINE

Kouichi Matsumoto, Gojyo, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 4, 1985, Ser. No. 772,418
Claims priority, application Japan, Sep. 6, 1984, 59-136002[U]
Int. Cl.[4] G03G *21/00*
U.S. Cl. 355—15 **5 Claims**



1. A cleaner for an electrophotographic copying machine comprising:

a blade in contact with the surface of a photoreceptive drum;

a cleaner unit; and

a container for storing toner stripped from the surface of said photoreceptive drum by the blade;

an aperture in said container provided in a position above a bottom surface of said cleaner unit,

a reciprocable conveyor member provided inside said cleaner unit, said conveyor member having a cleaning tip for reciprocating between the aperture of said container and said photoreceptive drum, and

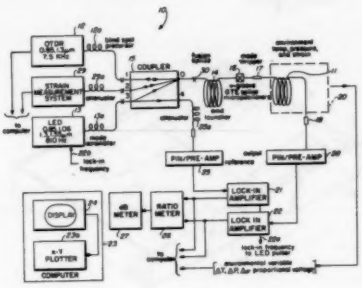
guide means for causing said conveyor member to move said tip into contact with the bottom surface of said cleaner unit when said conveyor member moves in the direction of the aperture of said container, and conversely, for preventing said tip of said conveyor member from contacting the bottom surface of said cleaner unit when said conveyor member moves in the direction of said photoreceptive drum.

4,685,799

INTEGRATED OPTICAL TIME DOMAIN REFLECTOMETER/INSERTION LOSS MEASUREMENT SYSTEM

Michael R. Brininstool, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jan. 13, 1986, Ser. No. 818,293
Int. Cl.[4] G01N *21/84, 21/88*
U.S. Cl. 356—73.1 **7 Claims**



1. An apparatus for evaluating environmental stress effects on a test fiber optic cable comprising:

means emitting light at one wavelength for providing an optical time domain reflectometer;

means emitting light at a second wavelength for providing a throughput loss (insertion loss) measurement thereof:

means emitting light at a third wavelength for providing an indication of strain on the test fiber optic cable;

means connected to the test fiber optic cable, the optical time domain reflectometer providing means, the throughput loss (insertion loss) measurement providing means and the strain indication providing means for the optically coupling thereof;

an equilibrium modal distribution launcher interposed between the optically coupling means and the test fiber optic cable; and

means operatively disposed with respect to the test fiber optic cable for varying temperature, pressure or strain thereof to enable an observation of the effects thereof, the optical time domain reflectometer providing means has a laser emitting at the one wavelength, the throughput loss (insertion loss) measurement providing means has an LED emitting at the second wavelength and the strain indication providing means has a laser emitting at the third wavelength and the optically coupling means is a 3×2 port tapered fiber coupler, a first port of the 3 is optically coupled to the optical time domain reflectometer providing means, a second port of the 3 is optically coupled to the strain indication providing means, a third port of the 3 is optically coupled to the throughput loss (insertion loss) measurement providing means and a zero port of the 2 is optically coupled to the equilibrium modal distribution launcher.

4,685,800

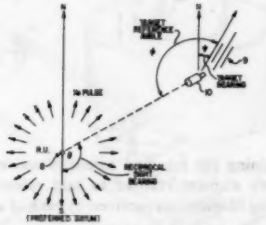
ALIGNMENT SYSTEM

Laurent J. Paquet, Ancienne Lorette, Canada, assignor to Her Majesty the Queen in right of Canada, Ottawa, Canada

Filed Jul. 16, 1984, Ser. No. 631,178
Claims priority, application Canada, Dec. 30, 1983, 444532
Int. Cl.[4] G01B *11/26*
U.S. Cl. 356—152 **5 Claims**

2. An azimuth alignment system comprising a reference unit including a first portion adapted to be aligned in a known orientation and a rotatable portion having at least one source of

highly directional light pulses adapted to be rotated about a vertical axis, a source of omnidirectional light pulses, and trigger means to enable said source of omnidirectional light pulses each time said source of highly directional light pulses rotates by a predetermined angular increment and when said source of highly directional light pulses passes a predetermined reference direction, said system including a detector unit mounted on a device to be aligned, said detector unit including an optical receiver for receiving light pulses, means for generating and storing numbers each having a magnitude proportional to time of arrival of a light pulse at said optical receiver, and means for processing said numbers to determine the angle through which pulses emitted by said source of highly directional light pulses travel between said reference direction and the direction of said detector unit, said means for generating and storing numbers comprising discrimination means for discriminating pulses received by said optical receiver which arrive at times corresponding to a predetermined cyclical pattern of pulses and pulses received by said optical receiver which do not arrive at times corresponding to said predetermined cyclical pattern of pulses.



4,685,801

APPARATUS FOR ABSORPTIOMETRIC ANALYSIS

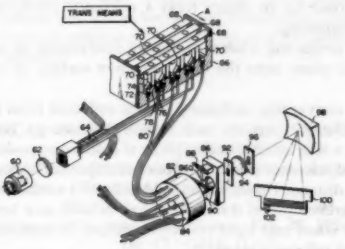
Tomiharu Minekane, Ootawara, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 541,658, Oct. 13, 1983, abandoned. This application Dec. 23, 1985, Ser. No. 814,169

Claims priority, application Japan, Oct. 15, 1982, 57-179753

Int. Cl.[4] G01J *3/08, 3/42*

U.S. Cl. 356—328 **7 Claims**



1. An apparatus for measuring absorbances of samples contained in reaction vessels, comprising:

illuminating means for emitting light beams;

measuring means for measuring the intensity of the light beams transmitted through the samples contained in the vessels;

transfer means for transferring reaction vessels successively forwarded to predetermined measuring points on a reaction line;

guiding means having stationary optical fibers, each with a beam-receiving end and a beam-emitting end, for guiding through a first portion of said stationary fibers light beams emitted from the illuminating means to the samples contained in the respective vessels staying at the measuring points, and for guiding through a second portion of said stationary fibers the light beams transmitted from the respective samples to the measuring means;

switching means for selecting one transmitted light beam through the reaction vessel staying at one measuring point, and directing the selected beam to the measuring means, said switching means including;

(a) a holder for holding the optical fibers, the beam-emitting ends of which are arranged so that the light beams passing through the optical fibers are emitted substantially simultaneously from the respective beam-emitting ends of the optical fibers;

(b) a first mirror for reflecting one light beam transmitted from the corresponding fiber;

(c) a rotating member for rotating the first mirror to align the same with the beam-emitting ends of said optical fibers one after another, so that said first mirror reflects the light beams from the corresponding fibers, the first reflecting mirror scanning the beam-emitting ends of all optical fibers held by the holder, every time the first mirror rotates when the vessels stay at the measuring points; and

(d) a second mirror for reflecting said light beam reflected from said first mirror and passing it through a common light path to said measuring means, regardless of the position of the optical fiber aligned with the first mirror;

a plurality of slit members disposed along the common light path; and

a diffraction grating, disposed along the common light path downstream of said slit members, for diffracting the beam that has passed through said slit members.

4,685,802

SMALL PARTICLE DETECTION SYSTEM

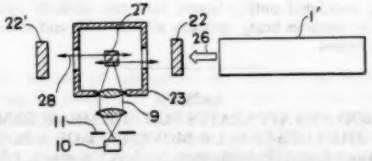
Susumu Saito, Hachioji; Michio Suzuki, Hino; Kyo Suda, Hachioji; Yasuo Yatsugake, Odawara, and Kazuya Tsukada, Oiso, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Electronics Engineering Co. Ltd., Kanagawa, both of, Japan

Filed Apr. 10, 1985, Ser. No. 721,904

Claims priority, application Japan, Apr. 11, 1984, 59-70885; Nov. 9, 1984, 59-234911

Int. Cl.[4] G01N *21/00*

U.S. Cl. 356—339 **8 Claims**



1. A small particle detection system comprising a laser oscillator, an external optical resonator adapted to resonate with an output from said laser oscillator, a detecting cell containing therein a sample stream, and an optical detecting element adapted to convert the scattered light from said sample stream into an electric signal, said detecting cell being disposed in said external optical resonator.

4,685,803

METHOD AND APPARATUS FOR THE MEASUREMENT OF THE REFRACTIVE INDEX OF A GAS

Gary E. Sommargren, Madison, Conn., assignor to Zygo Corporation, Middlefield, Conn.

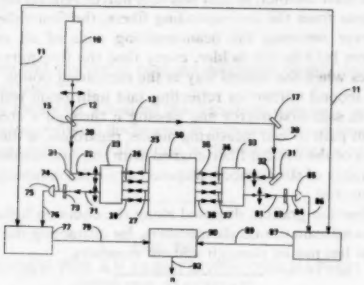
Filed Jan. 23, 1986, Ser. No. 821,773

Int. Cl.[4] G01B *9/02*

U.S. Cl. 356—361 **20 Claims**

1. An optical apparatus for measuring the absolute refractive index "n" of a gas, said apparatus comprising a light source and a vacuum cell optically aligned therewith and spatially sepa-

rated therefrom, said cell comprising a pair of inner optically reflective surfaces separable by a distance "L" and means for varying said distance "L" varying the optical path length of light travel within said cell; first differential plane mirror interferometer means optically spaced between said light source and said vacuum cell and in optical alignment therewith, said first interferometer means having a first associated measurement leg optically disposed outside of said vacuum cell and in said gas to be measured; second differential plane mirror interferometer means optically spaced between said light source and said vacuum cell in optical alignment therewith, said second interferometer means having a second associated measurement leg optically disposed in said vacuum cell; first means optically connected to said first interferometer means for receiving an output therefrom for measuring a first phase variation in said first differential plane mirror interferometer means



output for providing a first phase variation value as said distance "L" varies; second means optically connected to said said second interferometer means for receiving an output therefrom for providing a second phase variation value in said second differential plane mirror interferometer means output as said distance "L" varies; and means operatively connected to said first and second phase variation value providing means for receiving said first and second variation values and taking the ratio thereof for providing an output therefrom which is the absolute index of refraction "n" of said gas, said first and second differential plane mirror interferometer means being optically aligned with an input beam emitted from said light source, said first and second associated measurement legs having associated output beams, said pair of inner optically reflective surfaces being optically aligned with said associated output beams.

4,685,804

METHOD AND APPARATUS FOR THE MEASUREMENT OF THE LOCATION OR MOVEMENT OF A BODY

Hans-Peter Kugler, Zaisenhausen; Norbert Eisenreich, Pfinztal, and Wolfgang Liehmann, Karlsruhe, all of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Forderung der Angewadten Forschung e. V., Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 361,123, Mar. 23, 1982, abandoned. This application Apr. 9, 1985, Ser. No. 720,481

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1981, 3112026

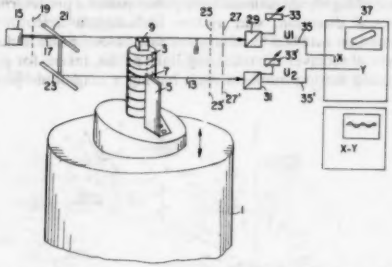
Int. Cl.[4] G01B *11/00*

U.S. Cl. 356—373 **32 Claims**

1. Method of measuring rate and extent of movement of an oscillatory element positioned on an oscillating system, said method comprising the steps of:

(a) passing a reference beam towards a reference detector over a reference edge, said reference edge being positioned on and fixed relative to said oscillating system;

(b) passing a measurement beam towards a measurement detector over a measurement edge, said measurement edge being positioned on a top surface of said oscillatory element such that said measurement edge generally moves together with said oscillatory element relative to said reference edge, whereby movement of said measurement edge cuts said measurement beam as it moves into the path of said measurement beam; and



(c) determining the rate and extent of movement of said oscillatory element relative to said reference edge by comparing illumination received by each of said detectors.

4,685,805

SMALL GAP MEASURING APPARATUS

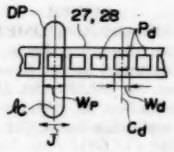
Kenichi Kodama, Kawasaki; Akikazu Tanimoto, Yokohama; Hisao Izawa; Yoichi Hamashima, both of Kawasaki, and Junji Hazama, Kawasaki, all of Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Filed Mar. 1, 1985, Ser. No. 706,970

Claims priority, application Japan, Mar. 2, 1984, 59-38837

Int. Cl.[4] G01B *11/00*

U.S. Cl. 356—373 **10 Claims**



1. An apparatus for detecting a positional deviation of a light reflective surface of an object from a reference plane, said apparatus comprising:

means for projecting a beam of energy converging on said reference plane onto the light reflective surface of said object;

means for converging said energy beam reflected from the light reflective surface, said converging energy beam forming a spot on a detecting plane at a different position from said reference plane, the size of said spot corresponding to a distance between said light reflective surface and said reference plane, a minimum size of said spot being attained when said light reflective surface is coincident with said reference plane;

detecting means including a plurality of detecting elements on which said spot is formed, said detecting elements being arranged with a predetermined pitch in a first direction on said detecting plane, each of said detecting elements having a detective width not greater than the width of said spot converged into said minimum size in said first direction and producing an output signal corresponding to the intensity of said energy beam impinging thereon, said detecting means producing a detection output on the basis of said output signal in response to said spot attaining said minimum size and

means for adjusting the relative positions of said spot and said detecting means whereby a center of said spot sub-

stantially coincides with a center of one of said plurality of detecting elements with respect to said first direction.

4,685,806

LASER PLANE APPARATUS FOR MEASURING CHARACTERISTICS OF TRAFFIC-BEARING SURFACES

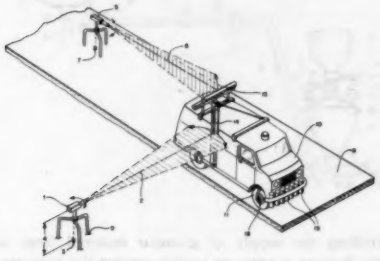
Peter W. Arnberg, Odeng 75 IV, 11322 Stockholm, Sweden

Filed May 30, 1985, Ser. No. 739,543

Claims priority, application Sweden, May 30, 1984, 8402952

Int. Cl.[4] G01B *11/24*

U.S. Cl. 356—376 **14 Claims**



1. A mobile system for measuring the characteristics of a traffic-bearing surface, comprising:

first laser means at one or more known elevations fixed with respect to one or more known, fixed points for generating one or more first laser planes over said surface;

a vehicle for traveling along said surface, in the direction of measurement;

a plurality of surface measuring means mounted on said vehicle for measuring the vertical distance to said surface as said vehicle travels along said surface;

first sensing means for sensing the point of incidence of each of said one or more first laser planes therewith, and for generating signals corresponding to the elevations of said points of incidence, said first sensing means being mounted on said vehicle a known, constant distance above said surface measuring means; and

processing means for processing said signals generated by said first sensing means and said surface measuring means to obtain values representative of the vertical elevation of said surface with respect to said one or more first laser planes, said values being compensated for variations in the vertical position of said vehicle as it proceeds along said surface.

4,685,807

OPTICAL MICROLITHOGRAPHY APPARATUS WITH A LOCAL ALIGNMENT SYSTEM

Bernard Picard, St. Martin d'Hereés, France, assignor to Commissariat a l'Energie Atomique, France

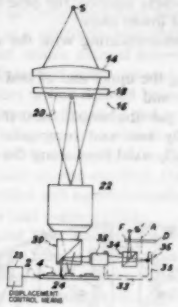
Filed Feb. 15, 1985, Ser. No. 702,393

Claims priority, application France, Feb. 28, 1984, 84 03027

Int. Cl.[4] G01B *11/00*

U.S. Cl. 356—401 **6 Claims**

1. An optical microlithography apparatus comprising a displacable support receiving a wafer over which are distributed chips to be irradiated, each chip being provided with at least one position finding mark, said apparatus further comprising an optical system and a system for the local alignment of the wafer, said optical system comprising a radiation source, a convergent lens, a reticle and a photoreduction lens for displaying the image of the reticle on a chip of the wafer, wherein the said local alignment system comprises a beam splitter between the photoreduction lens and the wafer, a source for illuminating the wafer by said beam splitter, means for collecting the image of the illuminated area around the position finding mark by said beam splitter said collecting means having a focal plane, an alignment pattern located in the focal plane of said collecting means and a means for controlling the displacement of the wafer support for aligning the image of the position finding mark on the alignment pattern.



4,685,808

METHOD OF DISCRIMINATING COLORS OF AN OBJECT

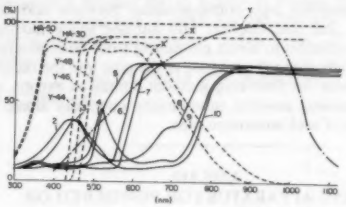
Toshiyuki Nakazawa, Tokyo, and Akio Izumi, Yokosuka, both of Japan, assignors to Fuji Electric Corporate Research and Development Co., Ltd., Yokosuka, Japan

Continuation-in-part of Ser. No. 757,134, Jul. 19, 1985. This application Apr. 7, 1986, Ser. No. 848,681

Claims priority, application Japan, Apr. 5, 1985, 60-71963

Int. Cl.[4] G01J *3/51*

U.S. Cl. 356—416 **5 Claims**



4. The method of determining the color of an object by irradiating the object with light from a white source and collecting the light reflected from the object with a silicon photodiode and comprising the current collected with a standard set of currents characterized in that the reflected light measured is limited to the wavelengths between a lower limit of from 440 nm to 480 nm and the upper limit of at least 900 nm.

4,685,809

FLUIDIZED BED APPARATUS

Herbert Hüttlin, Lörracher Strasse 14, 7853 Steinen, Fed. Rep. of Germany

Continuation of Ser. No. 532,171, Sep. 14, 1983, abandoned. This application Oct. 22, 1985, Ser. No. 790,758

Claims priority, application Fed. Rep. of Germany, Sep. 21, 1982, 3234911

Int. Cl.[4] B01F *13/02, 15/02;* F26B *17/10*

U.S. Cl. 366—101 **11 Claims**

1. A fluidized bed apparatus for mixing, drying, granulating, pelleting, coating and/or sugar coating pulverulent or granular material, comprising:

a receptacle which is at least approximately symmetrical about a receptacle axis, said receptacle having an interior

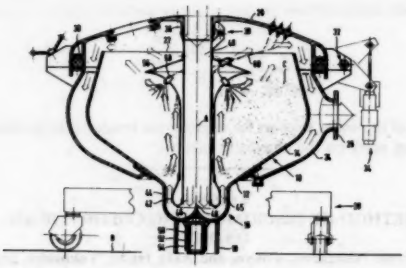
adapted to contain said material with a lower portion having a downwardly decreasing diameter terminating in a lower edge;

an immersion pipe which extends axially from above through the receptacle interior, the pipe having an exterior and upper and lower ends;

gas outlet means communicating with the receptacle interior;

means for connecting the upper end of said immersion pipe to a source of gas; and

means for directing gas discharged from the lower end of said pipe upwardly into said receptacle interior, in an annular, substantially axial flow along the exterior of said



immersion pipe, said means comprising a basin having a floor portion disposed below said lower end and a substantially cylindrical wall extending from the floor portion axially to the lower edge of the receptacle, said cylindrical wall being spaced radially outwardly of a lower portion of said immersion pipe and sized to define a narrow axially elongated annular space between said cylindrical wall and said immersion pipe communicating between said floor portion and said interior, said annular space having a height sufficient to direct gas exiting from said immersion pipe axially along the exterior of the pipe into the receptacle interior for fluidizing material contained therein and for entraining material substantially upwardly along the exterior of said immersion pipe.

4,685,810

MIXING APPARATUS FOR POWDERED OR GRANULAR MATERIALS

Sakakibara Sakuichi, Kobe; Tokuda Yoshiaki, Kyoto; Nagai Tamio, Suita; Takino Yorinobu, Yao, and Arai Tomiro, Hirakata, all of Japan, assignors to Matsui Manufacturing Co., Ltd. and House Food Industrial Company Limited, both of Osaka, Japan

Continuation-in-part of Ser. No. 620,154, Jun. 13, 1984, abandoned. This application Oct. 21, 1985, Ser. No. 779,658

Claims priority, application Japan, Jun. 14, 1983, 58-90623[U]

Int. Cl.[4] B01F *15/02, 13/02*

U.S. Cl. 366—150 **6 Claims**

1. An apparatus for mixing and dispersing powdered or granular materials into a liquid solvent with a pneumatic transport means comprising:

a supply hopper;

a pressure vessel which receives granular materials from the hopper for pressurization;

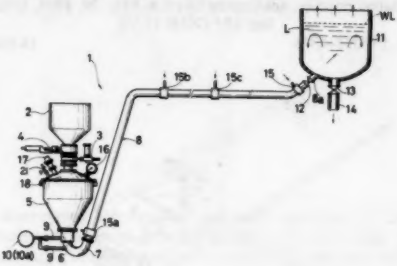
a granular material transport pipe attached at one end to the discharge portion of said pressure vessel;

a pneumatic force source for feeding the granular materials under pressure through said granular material transport pipes;

a mixing tank for accommodating the liquid solvent therein attached to the other end of said granular material transport pipe, said granular material transport pipe being connected to said mixing tank in an upward direction of a point below the surface of said liquid solvent contained in said mixing tank;

a check valve for preventing a counter-flow of the liquid solvent out of said mixing tank, said check valve being located in said transport pipe, but at a point near the connection thereof to said mixing tank;

a cyclic filling and emptying system including a gate valve



controlling the supply of granular material from said supply hopper, a pressure switch sensing the pressure in said pressure vessel, and an upper limit level gauge, wherein said gate valve, pressure switch and upper limit level gauge work in cooperation; and

said check valve being connected to said pressure switch so that said check valve is opened or closed in accordance with the internal pressure in said pressure vessel.

4,685,811

NON-INTRUSIVE MIXING OF FLUID

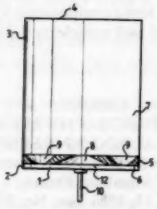
Geoffrey J. Pollard, Buckinghamshire, and Roger C. Baker, Hertfordshire, both of England, assignors to The British Hydromechanics Research Association, Cranfield, England

PCT No. PCT/GB84/00102, § 371 Date Nov. 28, 1984, § 102(e) Date Nov. 28, 1984, PCT Pub. No. WO84/03845, PCT Pub. Date Oct. 11, 1984

PCT Filed Mar. 27, 1984, Ser. No. 678,561

Int. Cl.[4] B01F *5/06*

U.S. Cl. 366—275 **15 Claims**



1. Apparatus for agitating a fluid medium comprising two compartments for the fluid medium, a diaphragm partly defining one said compartment, conduits interconnecting the two compartments, the conduits being of two types, the conduit or conduits together of the first type presenting a lower resistance to flow from one compartment to the other than the conduit or conduits together of the second type and the conduit or conduits together of the second type presenting a lower resistance to flow from the other compartment to the one compartment than the conduit or conduits together of the first type and means for flexing said diaphragm to vary the pressure in one compartment so as to force fluid to flow between the compartments through said conduits.

4,685,812

PROBE FOR THE DETERMINATION OF THE TEMPERATURES OF THE WALLS OF COKE OVEN FLUES

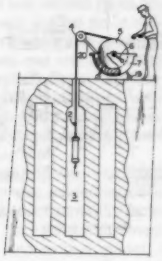
Hervé Sierpinski, Nancy, and Jean Philippe, Veckring, both of France, assignors to IRSID, Saint-Germaine-en-Laye, France

Filed Dec. 10, 1985, Ser. No. 807,083

Claims priority, application France, Dec. 10, 1984, 84 18822

Int. Cl.[4] G01K *1/08, 13/00;* **G01J** *5/04*

U.S. Cl. 374—132 **5 Claims**



1. Probe for determining the temperatures of walls of coke oven flues, comprising a measuring head (1) housing an optical pyrometer (14) for measuring the temperature of the walls of the coke oven flues, said pyrometer being suspended by connecting means (2) from a device (4–7) for manipulating said measuring head, said measuring head being constituted by an insulating sleeve (8,9) of uncooled refractory material, said connecting means being constituted by a metallic rope surrounded by a flexible sheath (12) of fibrous refractory material, and said manipulating device comprising a drum (5) for rapidly coiling and uncoiling said connecting means for exploration of the entire length of said flue in a short time, said refractory material of said insulating sleeve being of a thickness sufficient to protect said pyrometer from overheating during said short time said measuring head is exploring said flue.

4,685,813

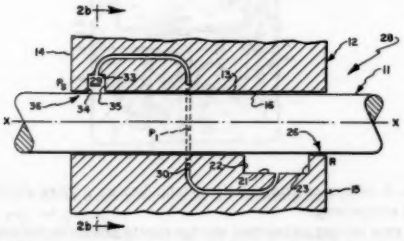
HYDROSTATIC BEARING

William C. Moog, East Aurora, N.Y., assignor to Moog Inc., East Aurora, N.Y.

Filed Jul. 28, 1986, Ser. No. 891,194

Int. Cl.[4] F16C *32/06*

U.S. Cl. 384—118 **36 Claims**



1. A hydrostatic bearing operatively arranged between relatively-movable first and second members, wherein the improvement comprises:

a sensing pad extending into one of said members and arranged to face the other of said members;

a bearing pad extending into said one member at a location opposed to the location of said sensing pad and arranged to face said other member, the projected area of said bearing pad being greater than the projected area of said sensing pad;

a passageway communicating said sensing and bearing pads so as to equalize the pressures therein;

a fluid source at a relatively-high supply pressure;

a fluid return at a relatively-low return pressure;

a variable inlet orifice defined between said members and extending from said source to said sensing pad;

a variable outlet orifice defined between said members and extending from said bearing pad to said return;

said orifices being so dimensioned and proportioned such that when said first member is in a predetermined position relative to said second member, the pressure drop across said inlet orifice will be substantially equal to the pressure drop across said outlet orifice;

whereby, if said first member moves from said predetermined position toward said second member such that the spacing between said sensing pad and said other member decreases, the pressure in said pads and passageway will increase to exert an increased net force which urges said first member to move back toward said predetermined position.

4,685,814

APPARATUS FOR DOT-MATRIX PRINTING OF CHARACTERS MISSING FROM A TYPE CARRIER

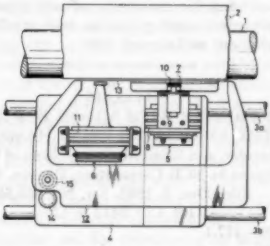
Takemi Yamamoto, and Yasuhiro Miki, both of Aichi, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Nov. 1, 1985, Ser. No. 794,134

Claims priority, application Japan, Nov. 2, 1984, 59-166966[U]

Int. Cl.[4] B41J *3/58, 1/30, 3/12*

U.S. Cl. 400—82 **6 Claims**



1. A composite printing apparatus including a first printing assembly having a type element carrier for impact printing with the type elements thereon and a second printing assembly for forming dot images of characters in accordance with character pattern signals supplied to the second printing assembly, the composite printing apparatus comprising:

means for detecting the type of font of the type elements on the type element carrier;

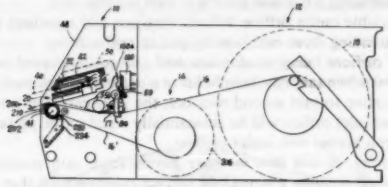
a pattern memory for storing a plurality of sets of character pattern signals; and

means responsive to the type of font detected by said detecting means for selectively accessing a set of character pattern signals stored in said pattern memory and for supplying said accessed character pattern signals to said second printing assembly.

4,685,815
PRINTING APPARATUS

Sandor J. Baranyi, Riverton, Wyo., assignor to Eaton Corporation, Cleveland, Ohio

Filed Mar. 21, 1986, Ser. No. 842,445
Int. Cl.[4] B41J *3/02, 13/10*
U.S. Cl. 400—120 13 Claims



1. A printing apparatus, comprising:

(a) a structure defining a feed path and means for feeding a print medium to be imprinted through said feed path;

(b) a print station including a printhead, a printhead holder for supporting said printhead and a platen located in a confronting relationship with said printhead, said print medium passing between said printhead and said platen when fed through said feed path;

(c) means biasing said printhead and platen towards each other such that a predetermined contact pressure is established between said platen and said printhead when said print medium is fed through said feed path to said print station; and

(d) floating mount means supporting said printhead, said floating mount means allowing compensating movement in said printhead relative to said platen whereby a substantially uniform contact pressure is applied to said print medium as it is imprinted by said printhead, said floating mount means comprises first and second pivot members, said first pivot member pivotally supporting said printhead on said printhead holder for pivotal movement about a first axis relative to said printhead holder and to said platen, said second pivot member supporting said printhead holder for pivotal movement about a second axis extending transverse to said first axis of said first pivot member, said printhead holder supporting said printhead and providing for movement of said printhead towards and away from said platen as said printhead holder is pivoted about said second axis.

4,685,816
IMPACT PRINTER WITH MEANS FOR ADJUSTING THE ASSOCIATED PRINT HAMMER

Ali T. Mazumder, and Brian M. Fairey, both of Waterloo, Canada, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 6, 1985, Ser. No. 805,681
Int. Cl.[4] B41J *9/127*
U.S. Cl. 400—157.1 6 Claims

1. A printing apparatus comprising:

a base plate;

a printing station including a document track which is perpendicular to and secured to said base plate;

presenter means located at said printing station for presenting characters to be printed in a first plane substantially parallel to said document track and located therein;

a support plate having a top surface and a bottom surface;

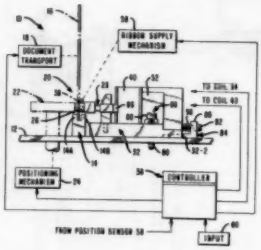
a print hammer;

means for pivotally mounting said print hammer on said support plate and also for moving said print hammer in a second plane parallel to said top surface of said support plate between non-printing and printing positions relative to said printing station;

said print hammer having an impact plane to cooperate with a selected one of a plurality of characters on said presenter means to print said character on a document positioned between said presenter means and said impact plane when said hammer is moved to said printing position;

said impact plane having mutually perpendicular first and second imaginary axes lying in said impact plane of said print hammer; first and second adjustable eccentric means coupled between said support plate and said base plate to enable said first imaginary axis of said impact plane to be positioned parallel to said first plane when said print hammer is in said printing position;

said support plate having a recess in said bottom surface;



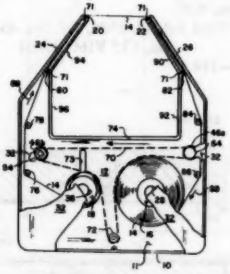
a moveable adjusting member slidably mounted in said recess next to said base plate to enable said second imaginary axis of said impact plane to be positioned parallel to said first plane and perpendicular to said support plate when said print hammer is in said printing position; and

securing means for securing said first and second adjustable eccentric means and said moveable adjusting member in fixed positions when said print hammer is in said printing position and said impact plane is parallel to said first plane.

4,685,817
RIBBON CARTRIDGE

Tyrone N. Surti, 424 Harding Industrial Dr., Nashville, Tenn. 37211

Continuation-in-part of Ser. No. 725,931, Apr. 22, 1985, Pat. No. 4,629,346. This application Apr. 22, 1986, Ser. No. 855,072
The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.
Int. Cl.[4] B41J *32/00*
U.S. Cl. 400—208 4 Claims



1. A ribbon cartridge for a printer having a drive member, and comprising:

a case having an internal storage cavity generally defined by sides of said case and including broad opposite face sides, front and rear opposite sides, and first and second opposite end sides;

a ribbon;

first and second spaced arms extending outward from said front side of said case and first ribbon guide supported by said first arm and a second ribbon guide spaced from said first ribbon guide and supported by said second arm, and

said first and second ribbon guides supporting said ribbon in a region impacted on by elements of a printer;

first and second spaced drive rollers within said case, said first drive roller having a drive member adapted to be driven from said printer through one said broad side of said case, and a said second drive roller being adapted to be driven from said printer through an opposite said broad side of said case, and said drive rollers positioned generally adjacent said end sides of said case, whereby one of said drive rollers would be driven at a time;

first and second spools spaced within said cavity, and said first spool being positioned generally proximate said first drive roller, and said second spool being positioned generally proximate said second drive roller;

at least one third ribbon guide positioned to guide said ribbon toward a said end side and along a path spaced from said first drive roller, and at least one fourth ribbon guide positioned to guide said ribbon toward an end side and along a path spaced from said second drive roller;

an idler roller positioned generally between said spools and adjacent said rear side;

said ribbon having opposite end regions wound on said spools and otherwise extending outward from a side region of each said spool generally facing said rear side, then extending over said third and fourth guides to and between said first and second guides, thus defining a path pattern wherein said drive rollers are within the confines of said pattern and out of contact with said ribbon; and

a belt extending around said drive rollers and said idler roller and generally over regions of ribbon on said spools, said last-named regions generally facing said front side of said case;

whereby, upon drive being applied to said first drive roller, it initially applies directive tension to said belt and a winding tension to ribbon wound on said first spool, then with movement of said first spool, the ribbon tension migrates to and beyond said idler roller to engagement of said ribbon with said second spool, and enabling unwinding of said ribbon from said second spool under a generally constant tension.

4,685,818

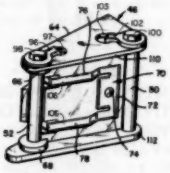
RIBBON FAULT DETECTION SYSTEM

Sam Kazarian, Santa Ana; Steffen D. Hagene, Huntington Beach; Kenneth A. McCrimmon, Jr.; Robert C. Miller, both of El Toro, and James A. Schwerin, Chino, all of Calif., assignors to Printronix, Inc., Irvine, Calif.

Filed Sep. 16, 1985, Ser. No. 776,614

Int. Cl.[4] B41J *35/36*

U.S. Cl. 400—249 **14 Claims**



1. A ribbon deck comprising the combination of:

a pair of spools;

means for rotatably driving the pair of spools;

means defining a ribbon path between the pair of spools;

at least one sensing member disposed adjacent the ribbon path and having a plurality of ribbon sensing elements for sensing the absence of a ribbon at different locations across the ribbon path between positions occupied by opposite edges of a ribbon when a ribbon is disposed within the ribbon path, each of the ribbon sensing elements including a resilient element disposed on one side of and biased to extend through the ribbon path into a first position in the absence of a ribbon thereat so as to complete electrical contact to a contact element positioned spaced-apart from and on said one side of the ribbon path, the resilient element being held against the resiliency thereof in a second position against the side of a ribbon when a ribbon is present thereat; and

means coupled to the plurality of ribbon sensing elements for indicating a ribbon fault condition in response to completion of electrical contact to the contact element of any one of the plurality of ribbon sensing elements.

4,685,819

TOOTHBRUSH

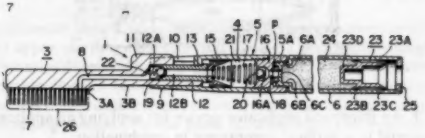
Sasuke Endo, 802, Hiroo Nashonaru Koto, 10-32, Minami Azabu 5-Chome, Minato-Ku, Tokyo-To, Japan

Filed Apr. 19, 1984, Ser. No. 601,850

Claims priority, application Japan, Apr. 20, 1983, 58-68450; Aug. 15, 1983, 58-148137; Feb. 8, 1984, 59-16570[U]

Int. Cl.[4] B43K *5/06*

U.S. Cl. 401—176 **6 Claims**



1. A toothbrush comprising:

(a) a handle having a container for containing tooth-brushing material in liquid or emulsion form and a main body, a rear end of which is connected detachably to a mouth of the container, the container having a movable bottom body which moves along an inner wall of the container as the material is sucked through the mouth of the container;

(b) a bristle planted rod provided, at its head, with a great number of bristles, and slidably inserted, at its root portion, into a forward bearing portion of the main body in such a manner that rotation of the rod can be avoided and the rod can be reciprocated axially, and the rod having a material feeding passage extending therein from its root portion to a bristle planted surface of the head of the rod;

(c) a pumping mechanism disposed within the main body for sucking the tooth-brushing material from the container and feeding the sucked material to the bristle planted surface, and operated in accordance with reciprocal axial movements of the rod, the pumping mechanism including a suction chamber disposed within the main body, sealing means within the suction chamber for effecting a vacuum in the suction chamber to suck the material from the container into the suction chamber, the suction chamber being in fluid communication with the mouth of the container, the sealing means including forward and rearward slide portions for slidingly engaging the inner wall of the suction chamber and for maintaining an airtight connection between the sealing means and the suction chamber, an operational pipe slidably mounted in the main body and connected between the rod and the sealing means, the operational pipe providing fluid communication between the material feeding passage in the rod and the suction chamber for pumping material to the bristle planted surface of the rod in response to reciprocal axial movement of the rod, the operational pipe and the sealing means, the pumping mechanism further including a valve body disposed between the container and the suction chamber for preventing the rearward flow of material from the suction chamber back into the container and a valve body positioned forwardly of the sealing means for preventing rearward flow of the material from the rod back into the suction chamber;

(d) elastic means disposed within the suction chamber for

biasing the rod in an axial position with respect to the main body of the handle;

(e) a rotation-preventing means including an operational projection formed on a peripheral surface of the root portion of the rod and functioning as a pushing member on which a finger is put when the rod is pushed axially; and

(f) a slit means, axially provided in a bearing portion of the main body, for slidably receiving the operational projection.

4,685,820

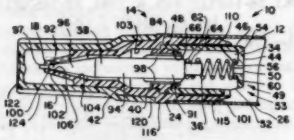
APPLICATOR DEVICE

Leon V. Kremer, Crystal Lake, and Ronald E. Kieras, Algonquin, both of Ill., assignors to Pittway Corporation, Cary, Ill.

Filed Jun. 5, 1985, Ser. No. 741,536

Int. Cl.[4] B43K *8/00, 1/06*

U.S. Cl. 401—260 **11 Claims**



1. An improved applicator device for applying an applicator material to a surface, comprising in combination:

container means for containing the applicator material;

a valve comprising a valve closure having a first and a second end and defining an internal closure cavity therein;

said valve including a valve body having a generally cylindrical side wall and a bottom face with valve body aperture means extending through said bottom face;

said valve including a valve guide having an internal bore;

said valve including a valve element having a proximal end and a distal end with said distal end defining a surface applicator for applying the applicator material to the surface;

said valve element having a plurality of guide ribs extending from an outer surface of said valve element for slidably engaging with said internal bore of said valve guide;

said plurality of guide ribs of said valve element defining a plurality of voids therebetween for enabling the flow of the applicator material through said plurality of voids;

said second end of said valve closure defining a valve seal and an applicator opening;

means connecting said valve closure to said valve body with said valve guide interposed therebetween and with said valve element being disposed in said internal closure cavity of said valve closure and slidably extending through said internal bore of said valve guide and with said surface applicator of said valve element extending through said applicator opening of said valve closure;

means connecting said first end of said valve closure to said container means for enabling the flow of the applicator material from said container means through said valve body aperture means;

bias means coacting between said bottom face of said valve body and said proximal end of said valve element for biasing said distal end of said valve element into sealing engagement with said valve seal of said valve closure for inhibiting the flow of applicator material through said applicator opening; and

said surface applicator being movable relative to said applicator opening against said bias means upon said surface applicator of said valve element being pressed against the surface thereby moving said valve element out of sealing engagement with said valve seat of said valve closure to enable the flow of the applicator material through an annular opening between said applicator opening of said valve closure and said distal end of said valve element to apply the applicator material to the surface.

4,685,821

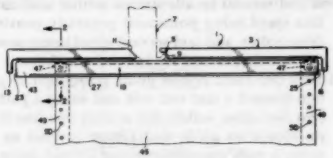
DOCUMENT HOLDER

Jesse Marsh, Viale Romagna 56/3, 20133, Milan, Italy

Filed Jun. 17, 1985, Ser. No. 744,950

Int. Cl.[4] B42F *3/00, 13/00, 1/12*

U.S. Cl. 402—4 **7 Claims**



1. A document holder for securing an assembly of sheets provided with aligned apertures and supporting the secured sheet assembly in a suspension filing system, which holder comprises:

(a) an elongate channel member partially defined by a pair of spaced side walls terminating in a pair of free edges;

(b) the free edges being inwardly disposed from the side walls to form a track defined by a pair of longitudinal ledges extending for substantially the entire length of the channel member but terminating short of one end thereof for defining an entry; and

(c) a binder element disposable within the channel member through the entry in a direction substantially transverse to the longitudinal axis of the channel member and slidably supportable on the track, which binder element includes means for detachably locking same onto the sheet assembly through the aligned apertures thereof.

4,685,822

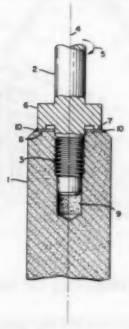
STRENGTHENED GRAPHITE-METAL THREADED CONNECTION

John F. Pelton, Yorktown Heights, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.

Filed May 15, 1986, Ser. No. 863,615

Int. Cl.[4] F16B *21/20*

U.S. Cl. 403—343 **28 Claims**



1. In a graphite shaft with a female thread adapted for threaded connection with a metal shaft having a male thread driven so as to tighten the joint between the shafts, said graphite shaft having an end surface, a portion of which comes into contact with a seating surface of a flange portion of said metal shaft upon the fastening of the shafts through said threaded

connection, the improvement comprising a coating on said portion of the end surface of the graphite shaft that is positioned to contact said seating surface of the metal shaft flange, said coating comprising a powdered material with individual particles that do not melt, disintegrate, or break up under the conditions of operation, together with a liquid binder phase capable of holding the particles together and bonding them to said graphite surface, with limited absorption of the liquid binder phase into the graphite porosity, said coating serving to substantially increase the friction between the graphite surface to which said coating is bonded and the metal contacting surface upon fastening of said coated graphite shaft with the metal shaft as compared with the friction between comparable uncoated graphite and metal contacting surfaces,

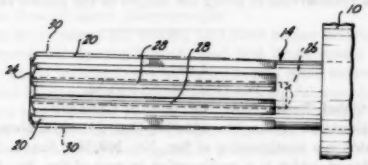
whereby the increased friction between the contacting surfaces upon completion of the connection between said coated graphite shaft and said metal shaft results in an increase in the torque streangth of the threaded connection such as to enable said threaded connection to have a greatly increased ability to transmit driving torque from the metal shaft to the graphite shaft.

4,685,823

ANTIBACKLASH SHAFT COUPLING

Nephi E. Lopez, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 23, 1980, Ser. No. 219,424
Int. Cl.[4] F16D *1/02*
U.S. Cl. 403—359 **3 Claims**



1. An antibacklash shaft comprising:

a shaft having an end and longitudinally extending, external, involute splines thereon, said shaft having an internal channel extending axially along the shaft and opening onto said end, said shaft being divided into longitudinally oriented, flexible segments by slots extending from the bottom of said spline into said channel, said segments being configured by the relief of internal stresses within said segments so that the outside diameter across said segments at said end of said shaft is greater than the outside diameter across said segments at a point located axially from said end of said shaft.

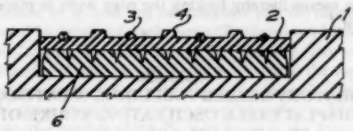
4,685,824

ROAD MARKING PROVIDED WITH PROTRUDING ELEMENTS CAPABLE OF RESISTING TO SNOW PLOWING IMPLEMENTS

Ludwig Eigenmann, POB 114, CH 6833 Vacallo, Switzerland

Continuation of Ser. No. 513,983, Jul. 14, 1983, abandoned. This application Aug. 7, 1985, Ser. No. 763,421
Claims priority, application Italy, Jul. 27, 1982, 22584 A/82; May 30, 1983, 213355 A/83
Int. Cl.[4] E01F *9/04*
U.S. Cl. 404—9 **7 Claims**

1. A road marking tape capable of resisting the impact of snow plowing implements and similar apparatuses sliding above a road surface and insertable into a groove provided on the road surface, the road marking tape comprising an upper marking tape part having a width and a length and provided with a plurality of retro-reflecting elements for ensuring the visibility of the tape in night time and a plurality of protruding elements acting as a rail and having a height at least equal to that of said retro-reflective elements, said protruding elements being formed so as to resist the impact of snow plowing means of snow plowing implements and the like; and means for preventing damaging said retroflecting elements by the snow plowing means by allowing said protruding elements under the impact of the snow plowing means to sink into the groove by a depth at least equal to the height of said rails so that they are located at least at a road pavement level and therefore said retroreflective elements are not damaged by the snow plowing means, said damaging preventing means being formed as a single compressible element located under said upper marking tape part with said retro-reflective elements and said protruding elements, said compressible element being coextensive with said upper marking tape part and having a width and a length substantially corresponding to those of the latter, said compressible element being composed of a compressible material which is compressible in any point in response to impact of said protruding elements by the snow plowing means in respective point so that under the action of the compression said compressible material of said compressible element is compressed in the respective point and said compressible elements changes its thickness in the respective point from its original thickness to such a thickness that said protruding elements in the respective point sink into the groove by said depth.

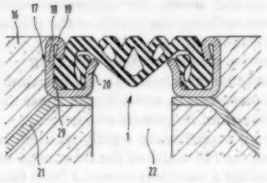


4,685,825

DEVICE FOR USE IN EXPANSION JOINTS

Günter Buckenauer, Baldham, Fed. Rep. of Germany, assignor to Friedrick Maurer Sohne GmbH & Co. KG, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 608,370, May 9, 1984, abandoned. This application Apr. 10, 1986, Ser. No. 851,272
Int. Cl.[4] E01C *11/12*
U.S. Cl. 404—65 **17 Claims**



1. A device for bridging an expansion joint gap in a structure, said joint gap being subject to change in the width thereof, said device comprising substantially u-shaped reinforcement holding means disposed in the structure at opposite sides of the joint gap, said reinforcement holding means being provided with a short inner leg and a longer outer leg with the open mouth of the u-shaped configuration facing the top of the joint gap, said outer leg being turned on itself at its end portion thereof to take the form of a hook-like head having an engaging surface facing opposite to said open mouth, at least one cellular expansive strip of elastic material adapted to be supported on the opposite sides of said joint gap, said strip having an upper side made up of interconnected planar faces that are always aligned in a single plane whenever the working state of the said strip, said planar faces being adapted to maintain their alignment with the top edges of the sides of the said joint gap

notwithstanding any changes in the width of the said joint gap taking place because of expansion and contraction thereof, said device having edge webs on each side of said cellular expansion strip, said edge webs extending to a lower level than said planar faces and having outwardly directed abutment faces at least one of said abutment faces facing opposite to and engaging said engaging surface of said hook-like head, said abutment faces being formed into lips, each such lip extending in the form of a feather or edge that becomes thinner in the direction removed from said lip, said feather pointing inwardly toward the top side of the strip and terminating in a bead molded thereon, said bead producing elastic lateral contact pressures and sealing by virtue of a wedging effect said edge webs being compressively disposed within the u-shaped reinforcement holding means thereby locking the edge webs in place with a force fit.

4,685,826

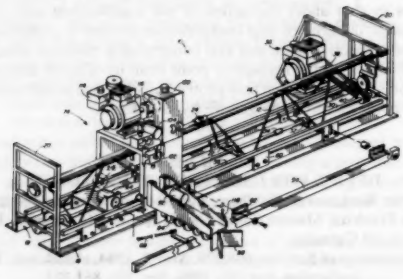
VIBRATORY SCREED INCLUDING A LATERALLY DISPLACEABLE OSCILLATING STRIKE-OFF

J. Dewayne Allen, Paragould, Ark., assignor to Allen Engineering Corporation, Paragould, Ark.

Continuation of Ser. No. 632,398, Jul. 19, 1984, abandoned, which is a continuation of Ser. No. 457,727, Jan. 13, 1983. This application Apr. 24, 1986, Ser. No. 855,888

Int. Cl.[4] E01C *19/30*

U.S. Cl. 404—114 **7 Claims**



1. Apparatus for finishing the irregular surface of an area of plastic concrete lying between first and second spaced apart, generally parallel forms, the spacing between the first and second forms defining the width of the plastic concrete, said apparatus comprising:

a. a vibratory concrete screed including

i. a triangular truss frame having front and rear edges, first and second ends, and a length equal to or greater than the width of the plastic concrete;

ii. a front screed blade rigidly secured to and extending along the full width of the front edge of said frame and including a vertically oriented front face and a horizontally oriented lower face for engaging and finishing the full width of the plastic concrete surface;

iii. a rear screed blade rigidly secured to and extending along the full width of the rear edge of said frame for engaging and finishing the full width of the plastic concrete surface;

iv. screed frame translating means for advancing said frame along the length of the plastic concrete;

v. means for vibrating said front and rear screed blades;

b. an oscillating strike-off coupled to said screed including

i. a strike-off blade including a first face having a planar front surface of a predetermined height with a top section, a lower linear edge and a second face having a planar lower surface, a leading linear edge and a trailing edge, wherein the lower linear edge of said first face intersects the leading linear edge of said second face to form a linear strike-off edge where the angle between the first and second faces is approximately equal to ninety degrees;

ii. suspension means rigidly coupled to said screed and to the top section of said strike-off blade for suspending said strike-off blade in close proximity to said front screed blade, for maintaining the first face of said strike off blade substantially within a vertical plane and the second face of said strike off blade substantially within a horizontal plane, for maintaining said strike-off blade at a fixed elevation with respect to said front screed blade with a fixed fore to aft spacing between said front screed blade and the trailing linear edge of said strike-off blade and for permitting said strike-off blade to be laterally displaced within a substantially fixed horizontal plane parallel with the lower face of said front screed blade; and

iii. means coupled to said screed and to said strike-off blade for continuously, laterally reciprocating said strike-off blade within the horizontal plane with respect to said non-reciprocating vibrating front screed blade at a fixed reciprocation frequency, said reciprocating means including motion generating means coupled to said screed and to said motion transmitting means for interconnecting said motion generating means with said reciprocating strike-off blade;

whereby said continuously reciprocating oscillating strike-off levels, smooths and compacts said plastic concrete surface immediately in time before engagement of said concrete surface by said non-reciprocating, vibrating front screed blade as said screed advances along the length of the plastic concrete.

4,685,827

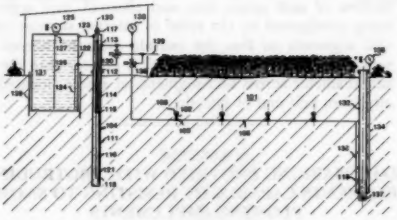
WATERING SYSTEM

Uwe Sibbel, Berlin-West, Fed. Rep. of Germany

Continuation of Ser. No. 684,986, Dec. 21, 1984, abandoned, which is a continuation of Ser. No. 269,281, Jun. 1, 1981, abandoned, which is a continuation-in-part of Ser. No. 224,250, Jan. 12, 1981, Pat. No. 4,347,687, which is a continuation of Ser. No. 040,883, May 21, 1979, abandoned, and a continuation-in-part of Ser. No. 90,086, Nov. 1, 1979, abandoned. This application Aug. 27, 1985, Ser. No. 771,132

Int. Cl.[4] E02B *13/00*

U.S. Cl. 405—37 **20 Claims**



1. An underground root watering system comprising a water reservoir and a pipeline located in the ground, said water reservoir being connected to said underground pipeline, further comprising a plurality of water supply units connected to said underground pipeline and surrounded by the ground, said water supply units being arranged at the same first level, characterized by means **132** being continuously always connected to the pipeline **105** and having a water level **119** which is lower than said first level of said supply units **102** and a control means **114** being capable of adjusting the watering system to a certain sucking tension of the soil and of automatically supplying the pipeline **105** with water according to the actual sucking tension of the soil around the supply units **102**.

4,685,828

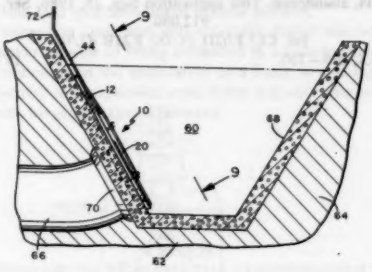
IRRIGATION CHANNEL GATE

Lee M. Whittle, P.O. Box 7, Brawley, Calif. 92227

Filed Jul. 10, 1986, Ser. No. 883,978

Int. Cl.[4] E02B *7/20*

U.S. Cl. 405—87 **17 Claims**



1. An irrigation ditch gate, comprising:

a frame;

port means for defining a passage for conduction of water, configured for mounting in a wall of an irrigation ditch and attached to said frame;

plate means pivotally mounted on said port means, for being pivoted transverse to said passage, between a closed position adjacent said port means to cover said passage and prevent the flow of water therethrough, and an open position to substantially uncover said passage to permit the flow of water therethrough;

a first lever means for moving said plate means between the closed and open positions, said first lever means being pivotally attached on a first end to said plate means;

second lever means for providing a moving fulcrum for said first lever means, said second lever means having a first end pivotally attached to said frame and a second end pivotally attached to said first lever means; and

retention means for exerting a retaining force on said first lever means substantially perpendicular to the direction of travel of said first lever means so as to urge said plate means into close wiping engagement with said port means.

4,685,829

MODULAR CONSTRUCTION SYSTEM FOR A COVERED STRUCTURE

Marcel Matiere, 17, avenue Aristide Briand, Aurillac 15000, France

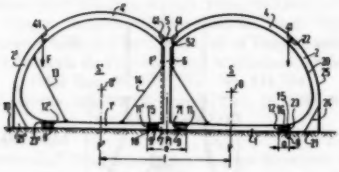
PCT No. PCT/FR85/00310, § 371 Date Jul. 2, 1986, § 102(e) Date Jul. 2, 1986, PCT Pub. No. WO86/02967, PCT Pub. Date May 22, 1986

PCT Filed Nov. 4, 1985, Ser. No. 887,107

Claims priority, application France, Nov. 5, 1984, 84 16810

Int. Cl.[4] E01F *5/00*

U.S. Cl. 405—124 **8 Claims**



1. Modular construction system for a covered structure of large cross-section produced by assembling prefabricated elements, each of which forms only a part of the perimeter and which comprise respectively plane elements (1) forming a floor laid on the ground, side elements (2) placed on each side of the floor, and roof elements (4) of curvilinear profile resting, with interposed articulated supports (41), on the top ends of the side elements (2), the latter including an incurved wall whose inner profile joins at the top that of the roof element (4) and, at the bottom, the top face of the floor (1), said incurved wall resting on the ground with interposed external stabilizers (21), which give them sufficient support to enable them to stand upright without additional support, the floor elements (1) being fastened at least to the base of the side elements (2) by sealing-in after installation, this structure being characterized by the fact that it is composed of at least two sections (S, S') lying side by side and having parallel axes (0, 0'), each bounded at the bottom by a floor element (1, 1'), at the top by a roof element (4, 4'), and, at the sides, on the outside by a side element (2, 2') and on the inside by at least one intermediate pier (6) supported on the ground by means of a sole piece (7) interposed between the adjacent longitudinal sides (11, 11') of the two floor elements (1, 1') framing it, said pier (6) being provided at the top with a longitudinal member (5) comprising two side walls (52) diverging in V-shape so as to form two support surfaces (53), one on each side of a median plane P_1, which are in the form of concave grooves on which rest the adjacent longitudinal sides (41) of the two roof elements (4, 4') framing said intermediate pier (6).

4,685,830

MINESHAFT CLOSURES

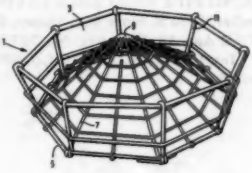
Robert E. Ford, Plas-y-Glynn, Glyndyfrdwy, Nr. Llangollen, Clwyd, Wales

Filed Nov. 8, 1985, Ser. No. 796,404

Claims priority, application United Kingdom, Nov. 9, 1984, 8428332

Int. Cl.[4] E21D *1/00*

U.S. Cl. 405—133 **6 Claims**



1. A closure for a mineshaft comprising

a stabiliser in the form of a deformable basket-like framework having an outer wall tapering inwardly from an open top to a base region of a conically shaped base, said conically shaped base projecting from said base region to its apex into the basket in a direction opposite to the inward taper of said outer wall for positioning fill in material adjacent to the walls of the mineshaft.

4,685,831

APPARATUS AND METHODS FOR REMOVING UNDERGROUND CABLE

Robert L. Mahoney, Arnold, Mo., assignor to Pierre L. LaBarge, Jr., St. Louis, Mo., a part interest

Filed Sep. 30, 1985, Ser. No. 782,083

Int. Cl.[4] F16L *1/00*

U.S. Cl. 405—156 **3 Claims**

1. An apparatus for removing underground cable, such as telephone cable and the like having a core of conductors surrounded by a sheath, the apparatus comprising:

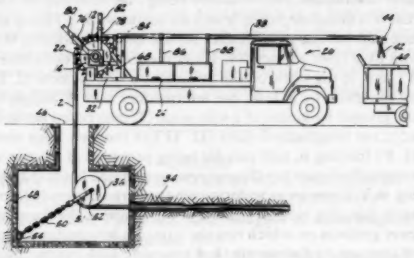
a sheave;

a plurality of generally U-shaped flanges equally spaced about the circumference of the sheave, the flanges extending radially outwardly from the sheave and forming a curved channel-shaped periphery on the sheave;

two semi-circular members removably secured over the

flanges, the members forming a ring in the curved channel-shaped periphery of the sheave;

a plurality of plates extending radially outwardly from the semi-circular members, each plate having a v-shaped notch therein, the notches in the plates defining a discontinuous v-shaped groove around the circumference of the sheave for frictionally gripping the cable;



at least one roller;

means for moving the roller toward the sheave to insure that the cable is held in the v-shaped groove;

means for rotating the sheave with the cable gripped in the v-shaped groove to pull the cable around a portion of the circumference of the sheave.

4,685,832

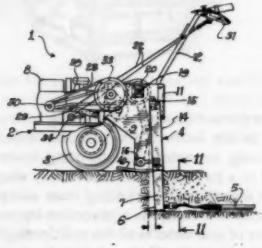
UNDERGROUND PIPE AND CABLE LAYING MACHINE

William J. Decker, 8554 S. Slope Rd., Santee, Calif. 92071

Filed Aug. 19, 1985, Ser. No. 767,354

Int. Cl.[4] E02F *5/10*; F16L *1/02*

U.S. Cl. 405—184 **8 Claims**



1. An apparatus for laying at least one filiform object such as a duct, conduit, cable or the like below the ground surface which comprises:

a carriage;

means for propelling said carriage above the ground surface;

a V-shaped cutting blade having two ribbon-like arms converging downwardly from the carriage to a tip at a predetermined depth into the ground, each of said arms being oriented to present its cutting edge in the forward direction of the carriage;

means at the lower tip of the blade for attaching one end of said filiform object;

means for imparting a fore-to-aft oscillating movement to the blade by reciprocally pivoting movements about a generally horizontal axis perpendicular to the carriage direction of travel; and

on said carriage, a power plant driving said means for propelling and said means for imparting.

4,685,833

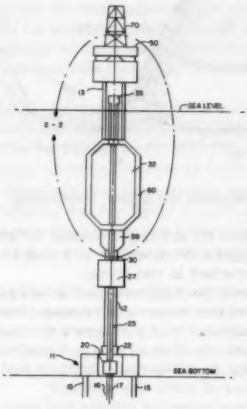
OFFSHORE STRUCTURE FOR DEEPSEA PRODUCTION

William T. Iwamoto, 15 Northampton Ave., Berkeley, Calif. 94707

Continuation of Ser. No. 767,656, Aug. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 594,309, Mar. 28, 1984, abandoned. This application Sep. 25, 1986, Ser. No. 912,050

Int. Cl.[4] E02D *21/00*; E21B *43/01*

U.S. Cl. 405—195 **18 Claims**



1. An offshore structure for deepsea production comprising a base founded on a sea-bed,

a buoyant body of double-wall structure having an outer wall and a containment means which is integrally a part of said buoyant body and is enveloped by said outer wall such that the pressure therein is maintained independently of the pressure outside said buoyant body, said containment means and said outer wall defining therebetween a controllably ballastable and deballastable space,

a leg connected to said base and to said buoyant body so as to substantially prevent vertical motions of said buoyant body, and

a production riser connecting said containment means with a subsea production tree which is independent of said base.

4,685,834

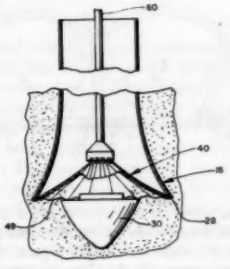
SPLAY BOTTOM FLUTED METAL PILES

Otis D. Jordan, N. Canton, Ohio, assignor to Sunohio Company, Canton, Ohio

Filed Jul. 2, 1986, Ser. No. 881,453

Int. Cl.[4] E02D *5/44*

U.S. Cl. 405—237 **19 Claims**



1. A pile, comprising:

the pile, said pile having a splayable fluted bottom portion,

an expansion cone, said expansion cone having flutes, said expansion cone located within said splayable fluted bottom portion, said expansion cone having a base, said expansion cone base connected to said splayable fluted bottom portion, said expansion cone have a top cap located within said splayable fluted bottom portion,

said expansion cone and said splayable fluted pile bottom portion capable of being expanded in a radially outward direction upon the application of a force to said top cap whereby said expansion cone flutes and said pile bottom flutes hingedly expand outward.

4,685,835

METHOD OF INCREASING THE COMPRESSIBILITY OF LIQUID-SATURATED MATERIAL

Karl Massarsch, La Hulpe, Belgium, assignor to S.A. Compagnie Internationale des Pieux Armes Frankignoul, Liege, Belgium

Filed Oct. 8, 1985, Ser. No. 785,450
Claims priority, application Sweden, Oct. 19, 1984, 8405249
Int. Cl.[4] E02D *3/12*
U.S. Cl. 405—263 **10 Claims**

1. Method of increasing the compressibility of a material in vicinity of building foundations where the material is saturated by a liquid to a predetermined degree and comprising changing the degree of liquid saturation of said material by incorporating discrete compressible bodies, filled with a medium, to a predetermined depth within said material in the vicinity of said building foundations, said discrete bodies being such as to reduce diffusion of said medium into said material.

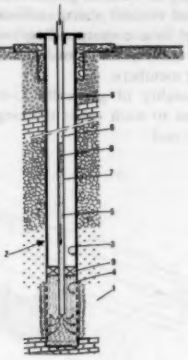
4,685,836

METHOD OF CONSOLIDATING A GEOLOGICAL FORMATION BY THERMAL POLYMERIZATION

Jacques Burger, Bougival; Claude Gadelle, Rueil Malmaison, and Jacques Salle de Chou, Paris, all of France, assignors to Institut Francais du Petrole, Reuil-Malmaison, France

Filed Dec. 30, 1985, Ser. No. 814,754
Claims priority, application France, Dec. 28, 1984, 84 19961
Int. Cl.[4] E02D *3/12*
U.S. Cl. 405—264 **17 Claims**

1. A method of consolidating a geological formation without appreciably reducing its permeability by alteration of a polymerizable substance, said method comprising the injection of a liquid organic mixture into the formation, then injection of a hot and chemically inert gas mixture through said liquid mixture, wherein said liquid organic mixture contains at least one polyethylenic hydrocarbon to which catalysts may be added and said chemically inert gas mixture is heated so as to raise the temperature of the formation to a value such that the liquid mixture is transformed by a thermal polymerization reaction



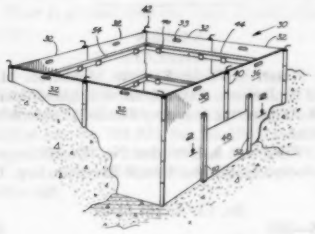
into a substance binding non-consolidated elements of the formation.

4,685,837

PORTABLE SAFETY TRENCH AND PIT FORM SYSTEM

William C. Cicanese, Rte. 1, Box 845E, Punta Gorda, Fla. 33950

Filed Jun. 9, 1986, Ser. No. 871,788
Int. Cl.[4] E21D *5/00*
U.S. Cl. 405—282 **8 Claims**



1. A multi-sided portable trench and pit form system comprising:

at least two panels forming each said side;

releasable interconnecting means for pivotally interconnecting the vertical margins of each adjacent said panel and side;

elongated brace means releasably interconnectable against each said side for rigidizing each said pivotal interconnecting means;

said brace means includes a plurality of rigid brace bars, the ends of each said brace bar mateably interengaging the end of the next adjacent said brace bar at the intersection between adjacent said sides for rigidizing the angular orientation between said adjacent sides.

4,685,838

RETAINING WALL

Valerian Curt, 45 De Bercy, Candiac, Quebec, Canada (J5R 4B8)

Filed Jun. 20, 1984, Ser. No. 622,558
Int. Cl.[4] E02D *29/02*
U.S. Cl. 405—284 **13 Claims**

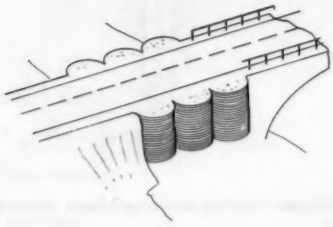
1. An embankment retaining wall structure comprising:

(a) a plurality of generally U-shaped members, each one of said plurality of generally U-shaped members comprising

an arcuate section having a vertical axis and two vertical ends;

(b) a plurality of vertical planar sections, each one of said plurality of vertical planar sections having a vertical end connected to a corresponding one of said two vertical ends of a corresponding one of said plurality of generally U-shaped members;

(c) said plurality of generally U-shaped members being contiguous to each other defining the face of the wall structure; and



(d) said plurality of vertical planar sections extending into the embankment and being sized, shaped, and positioned so that the lateral frictional forces of the retained embankment acting on both sides of said plurality of vertical planar sections exceeds the force of the embankment acting on said plurality of generally U-shaped members, thereby immobilizing the wall structure and retaining the embankment.

4,685,839

FISHPLATE

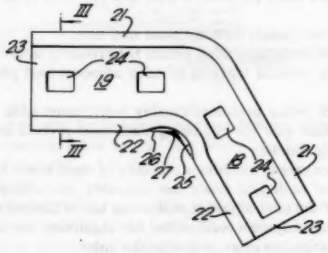
Michael G. Plater, Sheffield; Kenneth Middleton, Mansfield, and David B. Jackson, Retford, all of England, assignors to Hollybank Engineering Company Limited, Tuxford Nr. Newark, England

Filed Sep. 8, 1986, Ser. No. 904,379

Claims priority, application United Kingdom, Sep. 13, 1985, 8522669

Int. Cl.[4] E21D *15/02*

U.S. Cl. 405—288 **6 Claims**



5. A colliery arch support consisting of two legs and a roof bar, the legs being set at a predetermined angle to the roof bar, fishplates joining the legs to the roof bar, said fishplates being formed in two portions symmetrical in cross-section about a centre line and set at said predetermined angle to each other, the longitudinal edges of said fishplates having bulbous symmetrical rims so that in cross-section each fishplate has the apperance of a dumb-bell, and having a curved indentation at the inner edge of each fishplate to accommodate the junction between each leg and the roof bar.

4,685,840

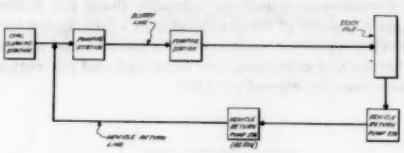
METHOD OF TRANSPORTING LARGE DIAMETER PARTICULATE MATTER

Robert C. Wolff, 955 Crystal St., New Orleans, La. 70124

Filed Aug. 2, 1985, Ser. No. 762,058

Int. Cl.[4] B65G *53/30*

U.S. Cl. 406—47 **84 Claims**



1. A method of transporting through a pipeline solid pieces having a diameter of more than two inches, the method comprising the steps of:

placing the solid pieces in a Newtonian vehicle having a specific gravity substantially similar to the specific gravity of the solid pieces to inhibit settling of the solids; and

pumping the large diameter solids and vehicle through the pipeline with a fluid piston pump.

4,685,841

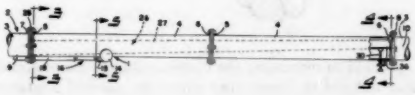
RE-ENTRAINMENT AND AIR BLEED DEVICE FOR PNEUMATIC PIPELINE CONVEYING SYSTEMS

Wayne R. Steen, McKees Rocks, and William J. Aitken, Monongahela, both of Pa., assignors to Hanna-Beric Systems, Inc., Cleveland, Ohio

Filed Mar. 24, 1986, Ser. No. 843,027

Int. Cl.[4] B65G *53/58*

U.S. Cl. 406—84 **9 Claims**



1. A pneumatic pipeline conveying system for pneumatically conveying particulate material through a pipeline comprising a pipeline conduit in which a gas flow is produced to transport the particulate material therewithin, and control means for maintaining the velocity of the gas within said pipeline conduit substantially constant, said control means comprising bleed valve means for bleeding gas into or out of said pipeline conduit in controlled amounts at plural locations along the length of said pipeline conduit to maintain the velocity of such gas substantially constant throughout the length of said pipeline conduit, said pipeline conduit including separation means providing for the separation of the particulate material and gas at such plural locations along the length of said pipeline conduit, said bleed valve means being in communication only with the gas that has separated from the particulate material at such plural locations.

4,685,842

SYSTEM FOR CONTROLLING SOLID TRANSPORT

David S. Smith, San Rafael, and Harold W. Kamins, Pinole, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

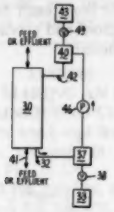
Filed Dec. 4, 1984, Ser. No. 677,701

Int. Cl.[4] B65G *53/30*

U.S. Cl. 406—106 **8 Claims**

3. A method for adding solids to a vessel which method comprises:

(a) supplying a liquid slurry of solids through an L-valve to the vessel;



(b) separating a portion of the liquid from the slurry exiting the L-valve; and

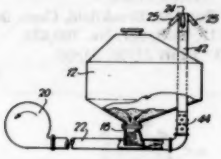
(c) controlling the flow of the separated liquid.

4,685,843

METHOD OF UNIFORMLY DISTRIBUTING GRANULAR MATERIAL

Daniel W. Kelm, Winnipeg, Canada, assignor to Flexi-Coil Ltd., Canada

Division of Ser. No. 304,940, Sep. 23, 1981, Pat. No. 4,575,284. This application Nov. 25, 1985, Ser. No. 802,015
Claims priority, application Canada, Jul. 22, 1981, 382218
The portion of the term of this patent subsequent to Mar. 11, 2003, has been disclaimed.
Int. Cl.[4] B65G *53/52*
U.S. Cl. 406—181 **6 Claims**



1. A method of uniformly distributing granular material, said method comprising the steps of:

producing a pneumatic stream carrying the granular material;

conveying said pneumatic stream through a conduit having a generally circular cross-section;

centering the granular material within said pneumatic stream with a portion of said conduit having an interior with a plurality of inwardly directed projections arranged in annular rows with the projections of one row being offset with respect to the projections of an adjacent row;

delivering said pneumatic stream from said portion to a header through an end portion of said conduit free of inwardly directed projections; and

dividing said pneumatic stream with said header.

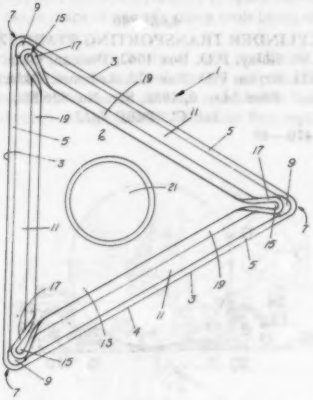
4,685,844

CUTTING INSERT

James F. McCreery, Latrobe, Pa., and Arthur D. Tilstone, Raleigh, N.C., assignors to Kennametal, Inc., Latrobe, Pa.

Continuation of Ser. No. 230,402, Jan. 30, 1987, abandoned. This application Nov. 7, 1986, Ser. No. 928,743
Int. Cl.[4] B23B *27/22*
U.S. Cl. 407—114 **2 Claims**

1. An indexable cutting insert comprising: a body having a top surface, a bottom surface and a peripheral wall joining said top and bottom surfaces; at least two angularly related and joined cutting edges formed at the juncture of said peripheral wall with one of said top and bottom surfaces; said one of said top and bottom surfaces having a positive rake surface adjoining said cutting edge; said positive rake surface forming a positive rake angle at the cutting edge which continuously increases as said positive rake surface extends inwardly from said cutting edge; a basin floor located inwardly of said positive rake surface; and an island located inwardly of said basin



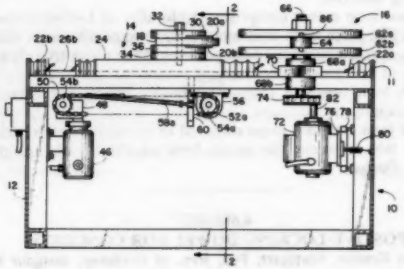
and raising above said cutting edge; said insert is invertable; said basin floor comprises a surface which rises as it extends inwardly from said cutting edge; said basin floor joins a rising wall forming a part of said centrally located island, and at said juncture of said basin floor said rising wall the upward slope of said basin floor is greater than the edge of said rising wall at said juncture.

4,685,845

GUIDE PAD RESURFACING APPARATUS

James Emter, 23429 NE. 29th Ave., Ridgefield, Wash. 98642

Continuation of Ser. No. 781,924, Sep. 30, 1985, abandoned. This application Nov. 10, 1986, Ser. No. 928,700
Int. Cl.[4] B23C *9/00*; B24B *7/00*
U.S. Cl. 409—145 **10 Claims**



1. Apparatus for resurfacing a pair of plugs disposed on opposite sides of a saw guide comprising:

(a) a frame;

(b) saw guide positioning means for holding the saw guide in a predetermined orientation relative to said frame; and

(c) upper and lower turntable plates horizontally disposed with respect to said frame and coaxially mounted on a single spindle for effecting resurfacing on opposite sides of said saw guide simultaneously

(d) motor means having an output shaft, said motor means being resiliently coupled to said frame; and

(e) belt drive means for coupling said output shaft to said single spindle

(f) a cutting head situated along an outer rim of each of said turntable plates and carrying a cutting stylus,at least one of said cutting heads having adjustment means for regulating the cutting depth of the stylus mounted on said cutting head.

4,685,846

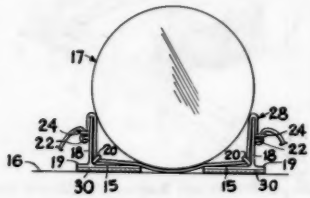
CYLINDER TRANSPORTING STABILIZER

Kenneth W. Golay, P.O. Box 1562, Duncan, Okla. 73533, and Bobby H. Bryan, P.O. Box 423, Ardmore, Okla. 73402

Filed Mar. 6, 1986, Ser. No. 836,880

Int. Cl.[4] B60P *7/12*

U.S. Cl. 410—49 **3 Claims**



1. A stabilizing device for horizontally transporting cylinders, or the like, comprising:

a pair of angle iron chocks disposed in spaced-apart relation adjacent the respective lateral side limit of a cylinder to be stabilized,

each chock of said pair of chocks being characterized by a pair of substantially equal width and length flanges disposed in right angular relation,

one flange of said pair of flanges of each chock being horizontally disposed and in confronting relation with the companion flange on the opposite chock;

a length of belting material extending between said pair of chocks beneath the cylinder for preventing separating movement of the chocks relative to each other or the cylinder; and,

loop means on said chocks transversely spanning the belting material for inducing friction gripping contact between the chocks and the representive end portions of said belting material,

said loop means comprising a plurality of U-shaped rod-like loops each connected at their respective ends with opposite marginal edge portions of the respective chock of said pair of chocks,

at least one said loop substantially bisecting the right angle,

at least two said loops disposed in vertically spaced relation adjacent the upper limit of the chock upright flange.

4,685,847

POSTIVE-LOCKING DOWEL FOR CONCRETE

Jürgen Kessler, Stuttgart, Fed. Rep. of Germany, assignor to Stumpp & Kurz GmbH & Co., Fed. Rep. of Germany

PCT No. PCT/DE85/00010, § 371 Date Sep. 17, 1985, § 102(e) Date Sep. 17, 1985, PCT Pub. No. WO85/03332, PCT Pub. Date Aug. 1, 1985

PCT Filed Jan. 15, 1985, Ser. No. 777,983

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1984, 3427228; Sep. 17, 1985, 8401123

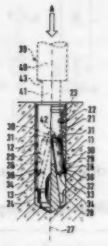
Int. Cl.[4] F16B *13/04;* **E04B** *1/40*

U.S. Cl. 411—22 **27 Claims**

1. A positive-locking dowel for reception within a bore formed in a hard building materials, especially concrete, comprising:

a casing defining a longitudinal axis and including at least one pin guide bore disposed at an acute angle to the longitudinal axis of the casing, said pin guide bore being partially formed as an open trough; and

a pin for each pin guide bore, each pin having a front end and a rear end, said front end serving to penetrate to the building material, wherein:



each pin guide bore includes a surface which serves to guide its respective pin throughout its displacement from an initial position to a driven-in final position, and means for holding its respective pin in assembly with the casing in the initial position of said pin; and

in the driven-in final position, each pin penetrates only by a part of its diameter the building material thereby holding the dowel in the bore of the building material.

4,685,848

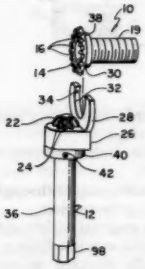
GEAR HEADED FASTENER AND DRIVE TOOL STRUCTURE

Alfred C. Langer, P.O. Box 148, Brookfield, Conn. 06804

Filed Feb. 12, 1985, Ser. No. 700,835

Int. Cl.[4] F16B *23/00, 35/06*

U.S. Cl. 411—402 **16 Claims**



1. A gear headed fastener of single element construction rotatable about its axis by a drive gear, operated at substantially 90° to the axis of said fastener; said drive gear tool having a rotatable drive gear axially fixed therein; said fastener being joinable with a mating fastener component, when screwed in place by said tool for the purpose of joining two or more objects; said fastener having a head portion formed as a ring gear with an opposing flat annular thrust surface as a part thereof, and a cylindrical portion which is axially forward of the thrust surface; said fastener being formed preselectively either with an axial bore therethrough, which may be threaded as a gear headed nut, or instead of a bore, said fastener having a male threaded shank projecting axially forward of the cylindrical portion; said drive gear tool having a nonrotating body with a "U" shaped offset yoke portion into which said cylindrical portion of said fastener is firmly yet rotatably received; the axis of said fastener thereby being held substantially at 90° to the axis of said tool's drive gear, and whereby the teeth of said gear headed fastener and drive gear tool are engaged, and whereby said tool's drive gear is used to rotate said fastener

about its axis while said tool's nonrotating body is used to remotely manipulate said fastener into alignment with a mating component, and remotely start screwing said fastener into threaded engagement with, and tighten said fastener to the mating component, so as to join two or more objects together.

4,685,849

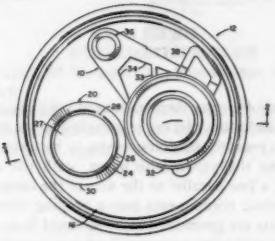
METHOD FOR MAKING AN EASY OPENING CONTAINER END CLOSURE

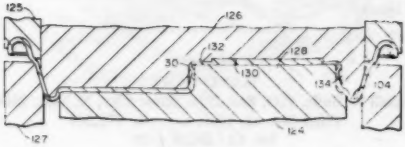
Robert L. LaBarge, Ben Avon, and Robert E. Heffner, Lower Burrell, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Division of Ser. No. 792,106, Oct. 28, 1985, Pat. No. 4,648,528, which is a division of Ser. No. 738,975, May 29, 1985, Pat. No. 4,580,692. This application Aug. 4, 1986, Ser. No. 892,796

Int. Cl.[4] B21D *51/42*

U.S. Cl. 413—22 **12 Claims**





1. A method of making an end closure for a container comprising the steps of:

providing a metal blank having an end wall and means for attaching the end wall to the open mouth of a container;

forming an upwardly projecting spout having a sidewall and an end wall in the end wall of the blank:

coining a marginal portion of the end wall around the periphery of the spout to extrude metal outwardly to form a continuous lip on the spout, with the lip having a top wall, a bottom wall, and an outwardly arcuate wall connecting the top and bottom walls.

4,685,850

TOOL AND WORKPIECE CHANGE SYSTEM

Takeshi Ohta, Nishio; Hiroshi Nakamura, Kariya, and Kazushi Murata, Nishio, all of Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan

Filed Sep. 24, 1985, Ser. No. 779,441

Claims priority, application Japan, Sep. 24, 1984, 59-199757

Int. Cl.[4] B65H *1/00*

U.S. Cl. 414—225 **3 Claims**

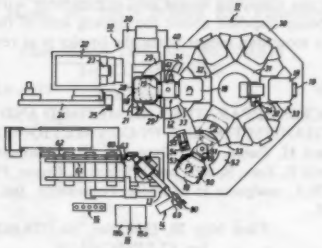
1. A tool and workpiece change system for a numerically controlled machining center with a pallet pool, said machining center being provided with a tool magazine for storing cutting tools, and said pallet pool having a pallet change station and a workpiece loading and unloading station and being associated with a pallet change apparatus arranged to replace a pallet on a worktable of said machining center with another pallet successively positioned at the pallet change station, wherein the tool and workpiece change system comprises:

a replaceable hand support arranged adjacent the workpiece loading and unloading station of said pallet pool to removably support thereon a first replaceable hand for grasping a workpiece and a second replaceable hand for grasping a cutting tool;

a workpiece support arranged adjacent said replaceable hand support;

a tool support arranged adjacent said tool magazine to removably support thereon a plurality of spare cutting tools each for use in place of one of cutting tools being stored in said tool magazine;

a robot provided independently of said machining center and adapted to be equipped selectively with said first and second replaceable hands on said replaceable hand support, said robot being operable with said first replaceable



hand for replacing a finished workpiece on a pallet unloaded to the loading and unloading station of said pallet pool with a fresh workpiece on said workpiece support when at a first position and being also operable with said second replaceable hand for replacing a defective or damaged cutting tool in said tool magazine with a corresponding one of the spare cutting tools on said tool support when at a second position; and

transfer means including a horizontally movable table carrying thereon said robot for transferring said robot between said first position which enables said robot to reach said workpiece support and said loading and unloading station and said second position which enables said robot to reach said tool support and said tool magazine.

4,685,851

RAIL CAR TIPPLERS AND TIPPLER INSTALLATIONS

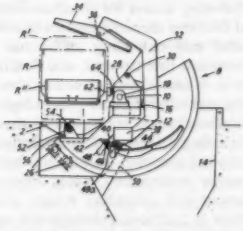
Paul J. Dowden, Westbury on Trym, England, assignor to DRG(UK) Limited, Bristol, England

Filed Nov. 27, 1984, Ser. No. 675,398

Claims priority, application United Kingdom, Nov. 28, 1983, 8331736

Int. Cl.[4] B65G *67/54*

U.S. Cl. 414—361 **13 Claims**



1. An open-sided rail car tippler comprising a tipping structure, rotary mounting means for said structure at opposite ends thereof defining a rotary tipping axis for the structure, a rail car

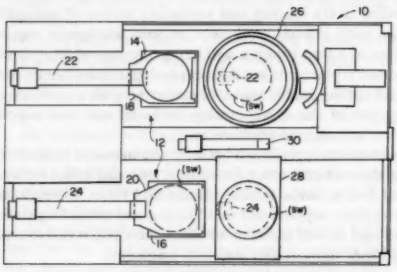
platform disposed in said structure, rails on said platform for a rail car, means for rotating the structure on said mounting means for tipping the platform with a rail car on it including at least one drive transmission element and at least one drive means for engaging said element, and top clamping means carried by the structure for holding the rail car on the platform when tipped, the tipping structure comprising a main longitudinal beam extending in the direction of said tipping axis, and fixedly connected to said drive transmission element, pivot bearing means at opposite ends of said beam engaging said rotary mounting means, said main beam transmitting the weight of the structure and the rail car through said bearing means to the rotary mounting means, pivot means fixed to said main beam holding the top clamping means, said pivot means defining a pivoting axis for the top clamping means, said pivot means defining a pivoting axis for the top clamping means for displacing said clamping means towards the rail car platform to bring the clamping means into engagement with the rail car and being disposed above the tipping axis of the main beam rotary mounting means when the tippler is at rest.

4,685,852

PROCESS APPARATUS AND METHOD AND ELEVATOR MECHANISM FOR USE IN CONNECTION THEREWITH

Richard H. Rubin, West Paterson; Gary Hillman, Livingston; Lewis E. Zarr, Sparta, and William K. Hayes, Parsippany, all of N.J., assignors to Machine Technology, Inc., Parsippany, N.J.

Filed May 20, 1985, Ser. No. 735,863
Int. Cl.[4] B65G *65/36*
U.S. Cl. 414—404 **30 Claims**



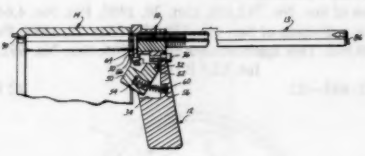
14. Apparatus for transferring workpieces from a first cassette to a second cassette, said first and second cassettes being adapted to store workpieces one above the other, said apparatus comprising unloading means movable between a retracted position and an extended position for successively unloading workpieces from said first cassette, loading means movable between a retracted position and an extended position for successively loading said workpieces into said second cassette, means for intermediately supporting and transferring unloading workpieces between said unloading means and said loading means, and indexing means for simultaneously and conjointly indexing said first and second cassettes in a common direction such that, after said unloading means has unloaded a first workpiece from said first cassette, said first cassette is indexed to a position in which a second workpiece can be unloaded therefrom and said second cassette is indexed to a position in which said first workpiece can be loaded thereinto, said indexing means including a first platform supporting said first cassette and a second platform supporting said second cassette, said first cassette horizontally offset relative to said second cassette, wherein said unloading means when in its said retracted position is positioned underneath said workpieces in said first cassette, and said loading means when in its said retracted position is positioned clear of said workpieces in said second cassette, whereby said unloading means when in its said retracted position engages one of said workpieces in said first cassette upon indexing thereof, and said loading means when in its said retracted position is clear of said workpieces in said second cassette upon indexing thereof.

4,685,853

DEVICE FOR LOADING COMPONENTS INTO A CENTRIFUGE TO BE TESTED

John L. Roshala, Arcadia, Calif., assignor to Trio-Tech, Burbank, Calif.

Filed Sep. 2, 1986, Ser. No. 902,570
Int. Cl.[4] B65G *65/00*
U.S. Cl. 414—404 **11 Claims**



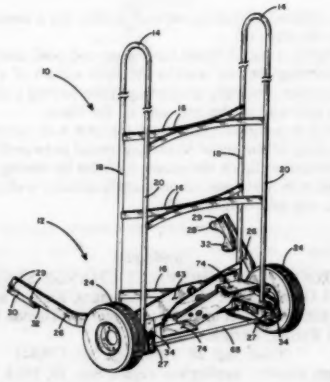
1. A method of testing the mechanical integrity of electronic components, including placing in a centrifuge an insert having receptacles to receive the components to be tested in circular positions about the axis of the insert, with the components aligned along a line parallel to the axis of the centrifuge, loading the electronic components into a holding element so that the components are positioned to be released from the holding element, and positioning a control device in a position between the holding element and the insert and causing the components to move from the holding element into the receptacles in the said insert.

4,685,854

HAND CART

Marshall R. Bulle, P.O. Box 2576, Silver City, N. Mex. 88062

Filed Sep. 12, 1985, Ser. No. 775,266
Int. Cl.[4] B62B *1/06*
U.S. Cl. 414—452 **12 Claims**



1. A hand cart having a frame with wheel means mounted thereon and including a pair of first and second side arms mounted pivotably to said frame, an improvement comprising:

means rotatably coupled to said frame and to said side arms for translating an indiced vertical force to a vertical pivotable force and then translating said vertical pivotable force to a horizontal force at said side arms, whereby said side arms may rotatably be brought to bear against objects placed therebetween;

said means including a force transmitting means having a

first pivot link pivotably mounted to said frame to pivot about a first link axis generally perpendicular to a pivot axis of said arms, a second link pivotably mounted to said frame to pivot about a second link axis generally parallel and spaced from said first link axis, force receiving means pivotably connecting said first and second links for said links to pivot simultaneously between first and second positions with a first fixed point of attachment on one of said links moving toward and from said first arm as said links move between said first and second positions and with a second fixed point of attachment on one of said links moving toward and from said second arm;

first rigid connecting means having a first end pivotably connected to said first point of attachment and a second end pivotably connected t said first arm; and

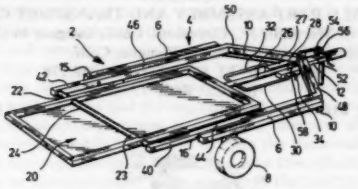
second rigid connecting means having a first end pivotably connected to said second point of attachment and a second end pivotably connected to said second arm.

4,685,855

UNIVERSAL TRAILER

Giuliano Celli, 95 Wakelin Crt., Woodbridge, Ontario, Canada L4L 1A9

Continuation of Ser. No. 666,159, Oct. 29, 1984, abandoned.
This application Sep. 12, 1986, Ser. No. 907,142
Claims priority, application Canada, Nov. 1, 1983, 440185
Int. Cl.[4] B60P 1/02
U.S. Cl. 414—482 **6 Claims**



1. A trailer comprising

an outer frame defining the tongue and sides of the trailer with supporting wheels on either side of said outer frame,

a load carrying bed secured to and generally intermediate the sides of said frame by mounting means, said mounting means including at least three link members pivotally secured to said outer frame and pivotally secured to said bed,

a pair of said link members being secured to said outer frame adjacent the rear portion thereof and to opposite sides of said outer frame with said pair of link members being interconnected by said bed to move as a unit for lifting and lowering the rear portion of said bed,

at least one of said link members other than said pair of link members being pivotally secured adjacent the forward portion of said bed and pivotally secured adjacent the forward portion of said outer frame for lifting and lowering the front portion of said bed,

said link members causing said load carrying bed to move from a transporting position generally within said frame to a generally parallel bed ground loading or unloading position below said frame,

means for selectively determining the direction of rotation of said at least one of said link members secured to the forward portion of the bed to effect movement of said bed from said transporting position to ground loading or unloading in one direction of rotation of said at least one of said link members and to effect angled loading or unloading of said load carrying bed in the opposite direction of rotation of said at least one of said link members secured to the forward portion of the bed, and means for raising and lowering said bed,

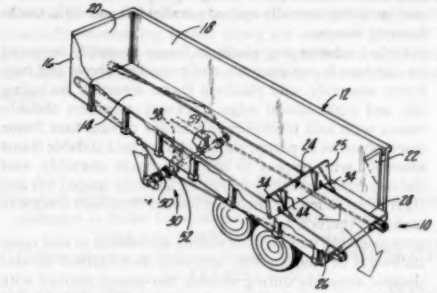
said means for raising and lowering said bed including a forwardly extending lever arm means rigidly connected to one of said pair of links which cooperates with a cable and winch means secured to said outer frame, said cable and winch means interconnecting said outer frame and said lever arm means to effect controlled movement of said bed between positions, said lever arm means providing a mechanical advantage in moving said bed and any load thereon to or from the transporting position.

4,685,856

PIVOTING GATE UNLOADER

Ronald F. Hesse, Jr., 10670 Warren Rd., Plymouth, Mich. 48170

Filed May 6, 1985, Ser. No. 730,816
Int. Cl.[4] B60P 1/00
U.S. Cl. 414—515 **6 Claims**



1. A device for unloading material from a truck bed, said truck bed having a top surface and a bottom portion extending between an open end and an opposite closed end, said device comprising:

a pair of cables, each of said pair of cables extending along said top surface of said truck bed, around said open end and said closed end and underneath said bottom portion;

means for supporting said cables about said open end and said closed end;

means for reciprocally displacing said cables mounted to said truck bed;

a gate having a top portion, a center portion and a bottom portion, said bottom portion pivotally mounted to said pair of cables, said gate pivotable between a first upright position for moving material towards said open end when said cables are displaced in an unloading direction and a feathered positioned for movement of said gate toward said closed end of said truck bed when said pair of cables are displaced in an opposite direction, said pair of cables pulling said gate along said top surface of said truck bed, said bottom portion of said gate extending diagonally downwardly from said center portion in a direction towards said open end of said truck bed when said gate is in said upright position, such that the weight of said material acts to direct said gate downwardly against said top surface of said truck bed when said gate is drawn through said material in said first upright and feathered positions,

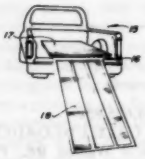
a pair of flexible elongated members, each of said pair of elongated members having one end affixed to said top portion of said gate and an opposite end mounted to a respective one of said pair of cables, said pair of elongated flexible members retaining said gate in said upright position when said gate is displaced in said unloading direction.

4,685,857

VEHICLE LOAD-CARRYING APPARATUS

Maurice N. Goeser, 5726 Carnelian La., Eden Prairie, Minn. 55344, and Alvin M. Eickhoff, 416 S. Fifth Ave., Cold Spring, Minn. 56320

Filed Nov. 25, 1985, Ser. No. 801,224
Int. Cl.[4] B65G *67/02*
U.S. Cl. 414—522 **11 Claims**



6. Adjustable load-carrying apparatus for mounting on the load-carrying bed of a vehicle, comprising

a base frame assembly for fixing rigidly to the vehicle bed and including laterally spaced parallel left and right track-forming means,

a slidable load-carrying platform frame assembly mounted on said base frame assembly and extending above said base frame assembly, said platform frame assembly including left and right lateral edge trackway members slidably mated with said track-forming means of said base frame assembly so as to permit sliding shift of said slidable frame assembly with respect to said base frame assembly, said slidable frame assembly including laterally spaced left and right ramp slideways medially inward from said trackway members thereof, and

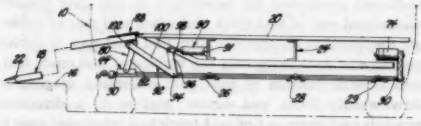
a ramp assembly mounted for sliding movement in said ramp slideways of said slidable assembly and carried by said slidable assembly during slidable movement thereof with respect to said base frame assembly, said ramp assembly including a rectangular ramp deck, a forward guide section, and a hinge connection between said ramp deck and said forward guide section, whereby said ramp deck may be pivotally lowered for ramp use while a foundation portion of the forward guide section remains in the ramp slideways of the slidable frame assembly.

4,685,858

VEHICLE ENTRANCE RAMP

Donald L. Manning, Orchard Lake, Mich., and Delos W. Hood, Reno, Nev., assignors to Transpec Inc., Troy, Mich.

Filed Feb. 20, 1986, Ser. No. 831,305
Int. Cl.[4] B65G *67/02*
U.S. Cl. 414—537 **5 Claims**



1. A vehicular passenger boarding system of the type including a door opening (**12**), a floor (**20**) within the vehicle, a ramp member (**18**) storable beneath said floor, a mechanism for moving said ramp laterally of the vehicle so as to extend through the door opening in such a way that the ramp's outer end can rest on the ground, said mechanism including means (**90-102**) for lifting the inner end of said ramp to the vehicle floor level when the ramp is in its fully laterally extended position whereby a passenger may enter or leave the vehicle by traversing said ramp without the impediment of a step, the improvement in said mechanism comprising:

A. a screw member (**30**) rotatably mounted in a housing structure (**32**) supported beneath the vehicle floor and adjacent said ramp, said screw member having

(1) a first end disposed proximate the inner end of said ramp when the ramp is stored beneath the vehicle floor; and

(2) a second end terminating proximate the door opening;

B. motor means (**74**) secured to said vehicle and drivingly connected to said screw member;

C. traveller means (**44**) including a threaded element (**58**) coacting with the screw member (**30**) and adapted to move axially relative to the screw member when the latter is rotated;

D. linkage means (**80**) pivotally connecting the traveller means (**44**) and the inner end of the ramp; and

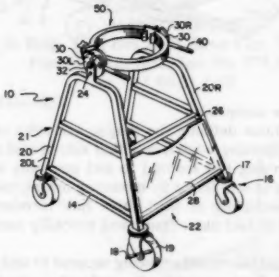
E. said lifting means (**102**) adapted to engage the inner end of the ramp and impart an upward movement to rotate the linkage means thereby raising said ramp inner end from said traveller means (**44**) and positioning said inner end in proximate alignment with the vehicle floor (**20**) when the ramp is in its fully laterally extended position.

4,685,859

MISSILE PART ASSEMBLY AND TRANSPORT CART

George C. Marshall, Jr., Claremont, Calif., assignor to General Dynamics, Pomona Division, Pomona, Calif.

Filed Mar. 12, 1986, Ser. No. 840,128
Int. Cl.[4] B66F *11/00*
U.S. Cl. 414—590 **6 Claims**



1. A workpiece transport cart assembly, comprising:

a retention collar for rigid attachment to a workpiece, the collar having a pair of trunnions projecting from opposite sides of the collar, the center axis of the trunnions defining a collar mounting axis;

a transport cart for releasably supporting said retention collar, the cart including a movable base, a frame attached to the base, and a pair of bearing members rotatably mounted on the frame, the bearing members being spaced apart and each being positioned for releasably engaging a respective one of said trunnions;

each bearing member having a slot for engaging a respective one of said trunnions, the inner end of each slot comprising means for rotatably supporting a respective trunnion and being at a position spaced from the axis of rotation of said bearing member on said frame;

first locking means for releasably locking said bearing members in a selected position against rotation relative to said frame; and

second locking means for releasably locking said trunnions in a selected position against rotation relative to said respective bearing members.

4,685,860

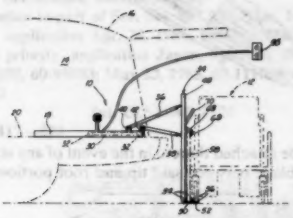
APPARATUS FOR LOADING A WHEELCHAIR OR SIMILAR OBJECT

Robert E. McFarland, 8301 NW. 39th Expressway, Bethany, Okla. 73008

Division of Ser. No. 565,164, Dec. 23, 1983, Pat. No. 4,573,854. This application Oct. 30, 1985, Ser. No. 792,874

Int. Cl.[4] B60R *7/00*; B66C *13/22*

U.S. Cl. 414—720 **10 Claims**



1. A limit switch for stopping an object moved by electrical power delivered thereto by an electrical circuit, said limit switch comprising:

shock-absorbing means having an opening in one end thereof; and

an electrical switch adapted for connection in said electrical circuit mounted in said opening, said switch having a pressure sensitive control button extending therefrom, out of said opening, said electrical switch and shock-absorbing means cooperating so that said button is movable independently of said shock-absorbing means and is positioned to be contacted by said moving object at least as soon as said shock-absorbing means is contacted thereby, and said electrical switch is effective to open the electrical circuit to interrupt electrical power at a time immediately prior to, or simultaneously with, contact of the moving object with said shock-absorbing means to arrest the momentum of said moving object;

wherein, said shock-absorbing means comprises:

a first substantially cylindrical retainer cap having an open end;

a second substantially cylindrical retainer cap having an open end, said one end of said shock-absorbing means being an end of said second cap spaced from said open end thereof, and said opening being a central opening in said one end, said switch being disposed in said second cap and said control button extending through said central opening opposite said open end;

a coil spring having a first end disposed in said open end of said first cap and a second end disposed in said open end of said second cap, and bearing against said switch, whereby said spring absorbs the impact of a moving object striking said second cap and said button; and

holding means for holding said caps, switch and spring together.

4,685,861

CONTINUOUS SHAFT-DRIVEN INDUSTRIAL ROBOT

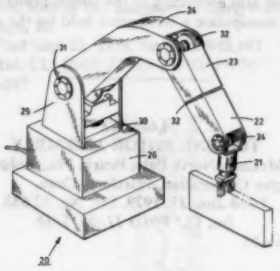
Larry Huetsch, Rockford, Ill., assignor to Michael Madock, River Forest, Ill.

Filed Oct. 30, 1984, Ser. No. 666,498

Int. Cl.[4] B66C *1/00*

U.S. Cl. 414—729 **26 Claims**

1. An industrial robot comprising a fixed base, a prime mover located in the fixed base, a plurality of mechanical links including pivot connections pivotably connected to each other in series, one of the mechanical links pivotably connected to the base, and a means for driving the mechanical links relative to each other and to the base, the driving means supported by the mechanical links and including a common mechanical, power transmitting means extending along one path through the plurality of links for transmitting power from the prime mover through the links and a plurality of selectively operating power take off means each located on a link adjacent a pivot connection, each for selectively taking power from the same power transmitting means, and each for driving one of the



mechanical links relative to another mechanical link about an adjacent pivot connection, the power transmitting means continuously transmitting power along the one path through the plurality of links, whereby the mechanical links are driven by the same prime mover and by the same power transmitting means.

4,685,862

INDUSTRIAL ROBOT

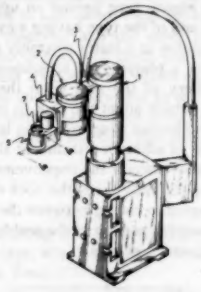
Masahide Nagai, and Kazutoshi Yokose, both of Tokyo, Japan, assignors to Seiko Instruments Inc., Tokyo, Japan

Filed Aug. 9, 1985, Ser. No. 764,674

Claims priority, application Japan, Aug. 17, 1984, 59-171035

Int. Cl.[4] B25J *9/22*

U.S. Cl. 414—744 A **18 Claims**



1. In an industrial robot having a movable arm which undergoes movement according to taught position data to manipulate a workpiece: support means carried by the arm and having means therein defining a through-hole; an optical magnifying device replaceably mounted in the through-hole and operative to effect initial alignment of the arm is a certain position so that position data can be produced to instruct the industrial robot to move the arm to the certain position; and a manipulating device replaceably mounted in the through-hole in place of the optical magnifying device for manipulating a workpiece from the certain position according to taught position data.

17. A control method of an industrial robot having an arm and being taught position data for controlling the movement of the arm, the method comprising the steps of:

inserting an optical magnifying device into a through-hole provided on the arm;

aligning an optical axis of the optical magnifying device with a reference point by moving the arm;

teaching position data representative of the aligned position of the arm to the industrial robot;

inserting a manipulating device into the through-hole in place of the optical magnifying device; and

moving the arm according to the taught position data of the arm to manipulate a workpiece held by the manipulating device.

4,685,863

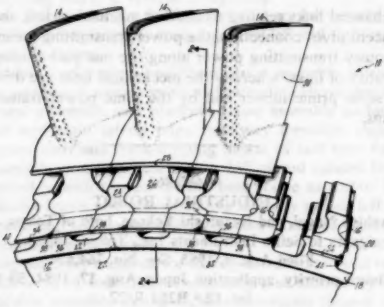
TURBINE ROTOR ASSEMBLY

Howard J. McLean, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Jun. 27, 1979, Ser. No. 52,633

Int. Cl.[4] F01D *11/00, 5/18*

U.S. Cl. 416—95 **14 Claims**



1. A rotor blade for a disk-blade rotor assembly of the axial flow gas turbine engine type having an upstream side and a downstream side and of the type having a cylindrical seal land adapted for opposition to a stator assembly of such an engine, the disk including a plurality of attachment slots extending across the periphery of the disk from the upstream to the downstream side which adapt the disk to receive the root of the rotor blade and having a lug extending laterally on the disk between each pair of adjacent attachment slots to form a portion of the seal land wherein the improvement comprises:

a lug extending laterally from the root of the rotor blade which is adapted to extend between the adjacent lugs and to form an annular portion of the seal land in conjunction with the adjacent disk lugs.

4,685,864

HOLLOW AEROFOIL BLADE

James P. Angus, Penrith, and Derick A. Perry, Derby, both of England, assignors to Rolls-Royce plc, London, England

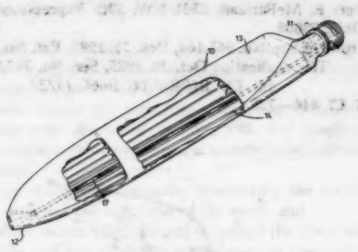
Filed Oct. 22, 1985, Ser. No. 790,200

Claims priority, application United Kingdom, Oct. 30, 1984, 8427405

Int. Cl.[4] F01D *5/12*

U.S. Cl. 416—229 R **13 Claims**

1. A hollow aerofoil cross-section rotor blade having a root portion for attachment thereof to a rotatable hub member and a tip portion at the opposite end thereof, said blade having at least one support member mounted internally thereof which extends between and is anchored to said tip and root portions, said at least one support member having an unanchored portion extending substantially between said anchored root and tip portions and which is nonsupporting relative to said blade under the normal operating conditions of said blade, but which is of sufficient strength to contain said tip portion and



any of said blade attached thereto in the event of any structural failure of said blade between said tip and root portions.

4,685,865

LIQUID RING COMPRESSOR HAVING OPENINGS IN HOUSING FOR EMPTYING LIQUID DURING STOPPAGE

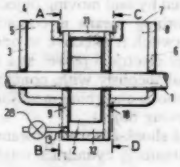
Siegfried Auschrat, Heiligenstedten, Fed. Rep. of Germany, assignor to Sihi GmbH & Co. KG, Itzehoe, Fed. Rep. of Germany

Filed Jul. 24, 1985, Ser. No. 758,282

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1984, 3427628

Int. Cl.[4] F04C *19/00*

U.S. Cl. 417—68 **10 Claims**



1. A liquid ring compresor having a horizontal shaft and at least one stage, each stage including suction and pressure chambers arranged at the side of a delivery chamber, a suction passage leading from the suction chamber to the delivery chamber, a pressure passage leading from the delivery chamber to the pressure chamber, and an impeller located within the delivery chamber and driven by the shaft chracterized in that:

only one common emptying opening (**13**, **13***a*, **13***b*) is provided for each stage for all chambers associated with this stage;

both the suction chamber (**5**, **21**) and the pressure chamber (**8**, **21**) of each compressor stage are in each case fluidly connected at their geodetically deepest located point to the delivery chamber (**12**, **12***a*, **12***b*) of the respective stage such that all liquid in the stage has a fluid path to the geodetically deepest point of the stage;

the emptying opening (**13**, **13***a*, **13***b*) is arranged at the geodetically deepest point of the respective stage; and

means are provided for selectively opening the emptying opening (**13**, **13***a*, **13***b*) to drain all the liquid from every chamber in the respective stage when the compressor is

not in use, and for closing the opening when the compressor is in use.

4,685,866

VARIABLE DISPLACEMENT WOBBLE PLATE TYPE COMPRESSOR WITH WOBBLE ANGLE CONTROL UNIT

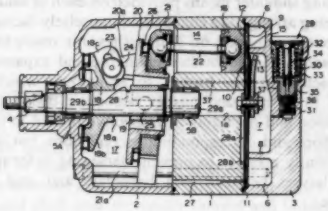
Kenji Takenaka; Masaki Ohta, and Hiroaki Kayukawa, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

Continuation-in-part of Ser. No. 839,908, Mar. 14, 1986. This application Apr. 28, 1986, Ser. No. 856,760

Claims priority, application Japan, Mar. 20, 1985, 60-56422; May 2, 1985, 60-95093; May 23, 1985, 60-111096; Jun. 13, 1985, 60-129362

Int. Cl.[4] F04B *1/26*

U.S. Cl. 417—222 **9 Claims**



1. A variable displacement wobble plate type compressor comprising:

a suction chamber for a refrigerant; a plurality of cylinder bores arranged so as to surround an axial drive shaft and having therein associated reciprocatory pistons disposed so as to draw the refrigerant from the suction chamber and to then discharge the refrigerant after compression in the discharge chamber; a crankcase having defined therein a chamber communicating with the cylinder bores and containing therein a drive plate mounted in such a manner that it is capable of rotating with the axial drive shaft as well as changing an inclination thereof with respect to the axial drive shaft and a non-rotating wobble plate held by the drive plate; a plurality of connecting rods connected between the wobble plate and pistons; a first passageway means for communicating said chamber of said crankcase with said discharge chamber; a first valve means arranged in said first passageway means, for opening and closing said first passageway means; a second passageway means for providing a first constant fluid communication between said chamber of said crankcase and said suction chamber; valve control means for controlling the operation of said first valve means in response in a change in fluid pressure in said chamber of said crankcase with respect to a predetermined pressure level, said valve control means moving said first valve means to a first position opening said first passageway means when pressure in said chamber of said crankcase is less than said predetermined pressure level, and to a second position closing said first passageway means when said pressure in said chamber of said crankcase is larger than said predetermined pressure level; a third passageway means arranged separately from said second passageway means, for providing a second variable fluid communication between said chamber of said crankcase and said suction chamber, said third passageway means including a portion thereof extending axially through said drive shaft and constantly communicated with said suction chamber, and; a movable means for closably opening said third passageway means at a position thereof adjacent to said chamber of said crankcase in direct relation to a decrease in said inclination of said drive and said wobble plates from a predetermined inclined position whereat said wobble plate is able to provide said pistons with the maximum reciprocatory strokes.

4,685,867

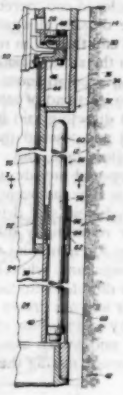
SUBMERSIBLE MOTOR-PUMP

Ronald J. Patun, Arlington Heights, and Donatas Tijunelis, Buffalo Grove, both of Ill., assignors to Borg-Warner Corporation, Chicago, Ill.

Filed Sep. 22, 1978, Ser. No. 945,143

Int. Cl.[4] F04B *17/00, 35/00, 39/06*

U.S. Cl. 417—367 **4 Claims**



1. A submersible pump-motor combination especially adaptable for use in a well casing containing well fluid, the motor being located in a housing filled with motor lubricant fluid with a motor fluid reservoir adjacent to one end thereof the improvement comprising:

heat pipe means spaced from said motor with one end in said housing exposed to said motor fluid circulating from said motor to said reservoir and the other end outside said housing exposed to said well fluid, said heat pipe means containing a heat transfer fluid which absorbs heat from said motor fluid and transfers heat to said well fluid, and means for circulating said motor fluid from said motor around said one end of said heat pipe means to said reservoir.

4,685,868

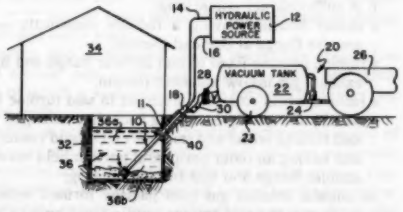
VACUUM JET APPARATUS

Donald A. Bodensteiner, Rte. 2, and David Wenthold, Box 207, both of Waucoma, Iowa 52171

Continuation of Ser. No. 763,682, Aug. 8, 1985, abandoned. This application Nov. 28, 1986, Ser. No. 936,984

Int. Cl.[4] F04B *21/00, 17/00*

U.S. Cl. 417—405 **9 Claims**



1. Apparatus for removing a liquid and solid mixture from a storage tank comprising:

an elongated hollow tube having a substantially open lower

inlet end and an upper closed end, wherein said inlet end is positioned within the liquid and solid mixture and includes an aperture substantially equal in size to a transverse cross sectional area of said hollow tube;

an intake assembly mounted to and extending outward from the inlet end of said hollow tube, said intake assembly having a plurality of apertures therein and a cross sectional area substantially equal to the cross sectional area of said elongated hollow tube;

vacuum means disposed outside of said elongated hollow tube and including in combination a vacuum pump and a vacuum tank evacuated by said vacuum pump, said vacuum tank coupled to said elongated hollow tube adjacent to the upper closed end thereof for drawing the liquid and solid mixture up said elongated hollow tube toward the upper closed end thereof in removing the liquid and solid mixture from the storage tank;

a propeller positioned adjacent to said intake assembly and outside of the inlet end of said elongated hollow tube for agitating and directing said liquid and solid mixture into the inlet end and toward the upper closed end of said elongated hollow tube; and

drive means disposed outside of and mounted to said elongated hollow tube adjacent to the upper closed end thereof and wherein said drive means is coupled to said propeller for rotationally displacing said propeller in a first direction for removing the liquid and solid mixture from the storage tank, wherein a portion of the liquid and solid mixture directed into said elongated hollow tube by said propeller and not drawn up toward the closed upper end thereof by said vacuum means is directed through the apertures in said intake assembly back into the storage tank for thorough mixing therein.

4,685,869

DEVICE FOR SUPPORTING NOZZLE VANES OF A TURBOCHARGER

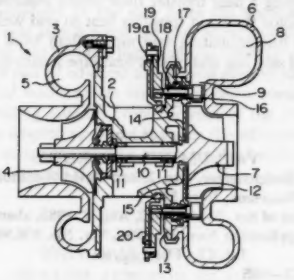
Shoji Sasaki, Mishima, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Oct. 3, 1985, Ser. No. 783,648

Claims priority, application Japan, Oct. 4, 1984, 59-149554[U]

Int. Cl.⁴ F04B *17/00;* **F01D** *25/26;* **F03D** *7/00*

U.S. Cl. 417—407 **11 Claims**



1. A turbocharger comprising:

a center housing having a radially outwardly extending annular flange at one end thereof;

a turbine housing fixed to said annular flange and having an exhaust gas inflow chamber therein;

a turbine wheel rotatably arranged in said turbine housing;

a radially outwardly extending backplate arranged between said turbine wheel and said one end of said center housing and having an outer peripheral portion held between said annular flange and said turbine housing;

an annular exhaust gas inlet passage formed between said backplate and said turbine housing and radially inwardly extending from said exhaust gas inflow chamber toward said turbine wheel;

a plurality of guide vanes rotatably arranged in said annular exhaust gas inlet passage, each of said guide vanes having a shaft which extends through both said backplate and said annular flange and projects beyond an exterior surface of said annular flange, said annular flange having a plurality of first bores formed therein to accommodate said shafts, said backplate having a plurality of second bores formed therein to accommodate said shafts, each of said first bores being aligned with said corresponding second bore;

a plurality of axially extending bushes each being received and mounted in at least one of a said first bore and a respective said corresponding second bore and rotatably supporting a corresponding said shaft therein; and

stop means effectively based on at least one of said backplate and said annular flange, this stop means having two axially oppositely-facing shoulder means arranged for cooperating with said bushes, by being normally spaced from a respective at least one of two respective axially oppositely-facing shoulder means provided on each of said bushes, but being arranged to engage said oppositely-facing shoulder means provided on said bushes, for restricting axial movement of said bushes upon thermal expansion and contraction of said bushes, to an amount which is too small to permit said bushes becoming dislodged from reception and mounting in respective of said at least one first bore and corresponding second bore, but which is sufficiently great as to prevent damaging deformation of said bushes between said backplate and said annular flange.

4,685,870

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

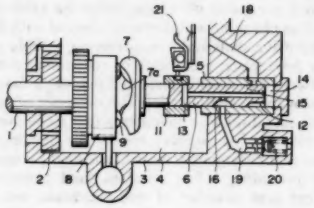
Yushi Kato, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed May 5, 1986, Ser. No. 859,643

Claims priority, application Japan, May 14, 1985, 60-100621; Feb. 25, 1986, 61-38284

Int. Cl.⁴ F04B *7/06, 39/10;* **F02M** *37/04*

U.S. Cl. 417—500 **6 Claims**



1. A fuel injection pump for an internal combustion engine, comprising:

a plunger disposed to be rotated and reciprocated; and

cam means having a camming surface operatively coupled with the plunger and disposed to be rotatively driven for causing rotation and reciprocation of the plunger to cause same to pressurize drawn fuel and distribute the pressurized fuel, to thereby deliver the pressurized fuel to the engine;

said camming surface of the cam means having such a configuration as to include a first angular region for causing the plunger to be lifted for pressurizing drawn fuel during idling of the engine at a first, substantially constant velocity, and a second angular region subsequent to said first angular region for causing the plunger to be lifted for pressurizing drawn fuel at a second velocity higher than said first velocity, and a third angular region preceding said first angular region, for causing the plunger to be lifted for pressurizing drawn fuel at a velocity higher than said first velocity, but lower than said second velocity.

4,685,871

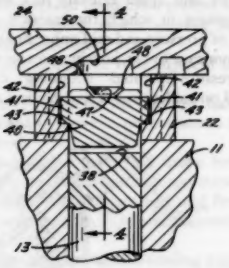
GEAR PUMP WITH MEANS FOR PREVENTING SHAFT LOCK-UP

Frank L. Harwath, Rockford, Ill., assignor to Suntec Industries Incorporated, Rockford, Ill.

Filed Sep. 2, 1986, Ser. No. 902,939

Int. Cl.[4] F04C *18/08;* **F16B** *3/00;* **F16D** *1/00*

U.S. Cl. 418—206 **3 Claims**



1. A gear pump comprising a body, an elongated metal shaft rotatably supported by said body and having an axially facing free end, a pinion gear rotatable with the free end portion of said shaft, radially and axially opening slots in the gear and the free end of said shaft, a key in said slots preventing relative rotation between said shaft and said gear, an upset at the free end of said shaft near the center thereof and holding said key axially in said slots, an end plate connected to said body and normally disposed in spaced opposing relation with the free end of said shaft, and a recess in said end plate in opposing relation with the free end of said shaft and sufficiently large and deep to receive the center portion of the free end of said shaft in the event said shaft is pushed toward said end plate.

4,685,872

MACHINE FOR THE PRODUCTION OF MOLDED PARTS FROM FOAMED PLASTIC

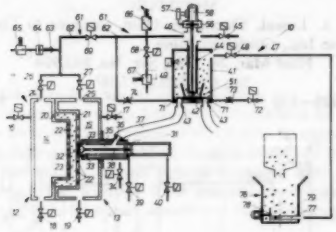
Hans Erlenbach, Hermann-Lons-Strasse 13, Nastatten D-5428, Fed. Rep. of Germany

Filed Jun. 17, 1986, Ser. No. 875,207

Claims priority, application Fed. Rep. of Germany, Feb. 1, 1986, 3603108

Int. Cl.[4] B29C *67/20*

U.S. Cl. 425—4 R **21 Claims**



1. A machine for the production of molded parts from foamed plastic, including soft foam plastics such as expanded olefin polymers and including plastic foam particles greatly expanded in frothing, in which machine there is provided a molding die having a cavity to be filled through a material inlet with expanded or with more or less frothed plastic particles under previously determined gas pressure conditions in its cavity, and in which machine there is a compressed gas operated filling device for the expanded particles, disposed in the material supply system for the molding die, characterized in that the filling device has an injector (31) with at least one injector nozzle (33) disposed in the area of its outlet (32) and connected to the molding die (11) and operating with compressed gas and has a material guiding canal (35) which is disposed ahead of the injector nozzle (33) in the material travel direction and which is connected to the material supply system by means of the material inlet (36), and further characterized in that there is a pressure equalization system (61) adapted to maintain in the material guiding canal (35) of the injector (31) and in the material supply system essentially the same gas pressure as in the cavity (23) of the molding die (11), said pressure equalization system having a venting canal and both the material guiding canal (35) of the injector (31) and the material supply system being connected to said pressure equalization system.

4,685,873

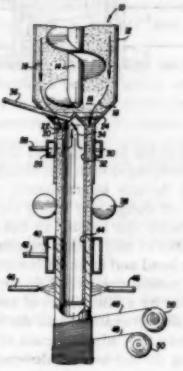
PROCESS FOR THE CONTINUOUS PRODUCTION OF PIPE FROM PARTICULATE MATERIALS

G. Fred Willard; Michael R. Wait; David A. Hutchings, and Sanford K. Lauderback, all of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 673,827, Nov. 21, 1984, abandoned, which is a continuation of Ser. No. 482,738, Apr. 7, 1983, abandoned. This application Nov. 20, 1985, Ser. No. 799,889

Int. Cl.[4] B29C *41/24, 47/04*

U.S. Cl. 264—83 **33 Claims**



1. A process for continuously producing pipe which comprises:

(a) coating a particulate material with an acid gascurable resin and an oxidizing agent suitable for accelerating curing of the resin, the amount of resin relative to the amount of particulate material being insufficient to reduce gas permeability of the compacted coated particulate material recited herebelow;

(b) compacting and forming said coated particulate material into an annular pipe configuration, which is gas permeable, in an annular space defined by the inlet ends of spaced inner and outer walls;

(c) feeding said compacted coated particulate material in said annular pipe configuration along a path, the initial part of which is said annular space between said inner and outer walls;

(d) feeding an acid curing gas through perforations in one of said inner and outer walls and through said gas permeable compacted coated particulate material in said annular pipe configuration as said compacted coated particulate material in said annular pipe configuration moves along said path and is supported by said inner and outer walls to diffuse said curing gas through said compacted coated particulate material and cure said resin and form said

particulate material into a self-supporting pipe having a porous wall;

(e) gripping said self-supporting pipe at a position along said path downstream from the outlet end of said outer wall and drawing said self-supporting pipe along said path;

(f) feeding a sealant into said porous wall of said self-supporting pipe to impregnate said porous wall with said sealant at a position along said path downstream from said outlet end of said outer wall; and

(g) recovering the cured and impregnated pipe.

4,685,874

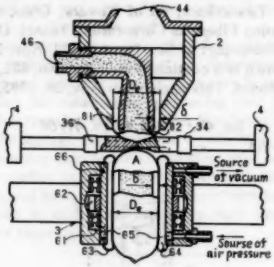
METHOD OF AND APPARATUS FOR FORMING FILLED DOUGH PRODUCTS

Ilya Dreisin, 353 W. 57 St. #1257, New York, N.Y. 10019

Filed Nov. 14, 1985, Ser. No. 798,222

Int. Cl.[4] A21C *3/00*

U.S. Cl. 425—132 **5 Claims**



1. An apparatus for forming filled dough products comprising means for pumping dough and filling to measuring devices; said measuring devices intermittently extruding a predetermined quantity of dough and filling through an extrusion die head; said extrusion die having an outer conduit means connected to an outlet of said dough measuring device by a dough inlet of said die head and an inner conduit means inside of said outer conduit means connected to an outlet of said filling measuring device by a filling inlet of said die head; a pinching device located downstream of said die head for forming, closing and separating two adjacent ends of two adjacent product items; a twisting device located downstream of said pinching device for turning a just extruded item around an axis of extrusion; and a control system for controlling said means for pumping dough and filling, said measuring devices, said pinching device and said twisting device; wherein said measuring devices are plunger extruders having synchronized plungers movable along a longitudinal axis of rotary measuring cylinders; said rotary measuring cylinders being rotatable about said longitudinal axis.

4,685,875

PRESSURE RELIEF DEVICE FOR EXTRUSION APPARATUS

Léon Chevroulet, and Guy Salmon, both of Pratteln, Switzerland, assignors to Buss AG, Basel, Switzerland

Filed Aug. 23, 1985, Ser. No. 768,869

Claims priority, application Fed. Rep. of Germany, Aug. 25, 1984, 3431274

Int. Cl.[4] B29C *47/96, 47/16*

U.S. Cl. 425—136 **3 Claims**

1. A continuously operable extrusion apparatus, comprising:

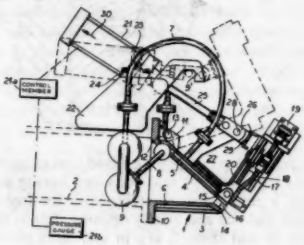
an extruder having a substantially horizontal worm-extrusion cylinder having a discharge end; and

a discharge nozzle mounted at said end, said discharge nozzle including:

a housing formed with a lower housing part and an upper housing part inclined toward said lower housing part in an extrusion direction to include an acute angle with said lower housing part and define therewith an elongated continuously open extrusion-defining outlet slot transverse to an axis of said cylinder,

pivot means for mounting said upper housing part to swing about a pivot axis transverse to said axis of said cylinder exclusively between a singular closed operating position in which said continuously open slot is formed and in part defined by said upper housing part and a singular open relief position in which the interior of said housing is relieved of pressure and said upper housing part is inclined away from said lower housing part in said direction,

a fluid-pressure-operated actuating cylinder pivotally mounted on said extruder and having a piston rod pivotally connected to said upper housing part for swinging said upper housing part between waid positions,



sensing means in one of said extruder and said housing for detecting at least one extrusion parameter from the extrusion pressure and the extrusion temperature,

a control member connected to said sensing means and to said actuating cylinder for operating said actuating cylinder to swing said upper housing part into said relief position from said operating position only upon the detected parameter exceeding a predetermined limit, and

respective sliders mounted on said upper housing part and variably displaceable to define respective channels along said slot, and control means independently of said actuating cylinder operatively connected to said sliders for selectively displacing the sliders.

4,685,876

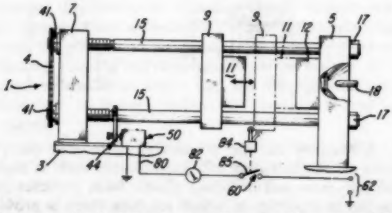
TOGGLE INJECTION MOLDING CLAMPING FORCE MONITOR

Anthony A. Loscei, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Mar. 24, 1986, Ser. No. 842,954

Int. Cl.[4] B28B *17/00*

U.S. Cl. 425—170 **9 Claims**



1. A toggle plastic injection molding machine comprising

a machine frame;

a back platen;

a fixed platen;

a plurality of tie rods connected between said back and fixed platens to resist forces tending to move said platens apart and to place said tie rods in tension;

ways supported on said frame between said platens;

a movable mold platen supported on said ways between said back and fixed platens with said tie rods slidably passing therethrough;

clamping means including a toggle linkage between said back platen and said movable platen for moving the latter on said ways to and from said fixed platen;

said tie rods being placed in tension when respective mold halves on said moving and fixed mold platens are clamped together by said clamping means moving said moving platen toward said fixed mold platen;

a link attached to one of said tie rods adjacent to said back platen;

a mechanical contact supported on said link facing toward said movable platen to move in proportion to the elongation of said tie rod;

a sensing means supported from said frame between said back and movable platens to sense tie rod stretch by relative motion between said contact and said frame and to provide a signal representative of and responsive to such relative motion; and

a movable probe element part of said sensing means extending therefrom toward said contact and being engageable by said contact.

4,685,877

FOOD EXTRUDING APPARATUS

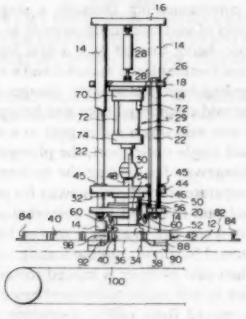
Masaru Harada, Kanagawa, Japan, assignor to Kabushiki Kaisha Kibun, Tokyo, Japan

Filed Jun. 10, 1986, Ser. No. 872,497

Claims priority, application Japan, Jun. 10, 1985, 60-125463

Int. Cl.[4] A23P 1/12; B29C 47/12

U.S. Cl. 425—190 **5 Claims**



1. A food extruding apparatus comprising:

a food receiving member having a through-hole for receiving a food or a food material which is to be extruded;

an extruding means inserted into said through-hole from one end thereof and moved toward a second end, thereby extruding the food or food material received in said through-hole from said second end of said through-hole; and

an actuating means for moving said extruding means from said first end of said through-hole toward said second end and also for returning said extruding means to its original position;

said extruding means having an annular outer extruding member having an outer diameter slightly smaller than the inner diameter of said through-hole, and an inner extruding member disposed inside said outer extruding member; and

said actuating means being adapted to operate in such a manner that, when the inner and outer extruding members of said extruding means are returned from said second end of said through-hole to said first end, said outer extruding member is first returned at a relatively slow speed, and then said inner extruding member is returned.

4,685,878

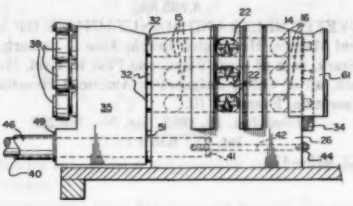
HIGH VOLUME DOUGH PIECE PRODUCTION APPARATUS

Albert A. Pinto, White Plains, N.Y., assignor to Nabisco Brands, Parsippany, N.J.

Filed Aug. 11, 1983, Ser. No. 522,293

Int. Cl.[4] B29C 47/38, 47/92, 47/34

U.S. Cl. 425—202 **5 Claims**



1. Dough piece production apparatus comprising in combination:

a continuously movable conveyor;

An extrusion mechanism including a pair of extrusion nozzles disposed above said conveyor and spaced longitudianlly along said conveyor;

feeding means for feeding dough through said nozzles, said feeding means including a pair of screw extruders each comprising an auger in a bore, said screw extruders communicating with a common inlet, the augers of said screw extruders being commonly driven and connected and to end at said inlet, said augers having threads of opposite pitch;

means for axially positioning said augers with respect to said inlet to balance the relative output of said screw extruders;

means for cutting off sections of dough extruded from said nozzles to form dough pieces; and

means for driving said conveyor at a speed related to the spacing of the nozzles and the rate of dough piece formation so that a line of equally spaced dough pieces is formed on said conveyor.

4,685,879

CALIBRATOR FOR EXTRUDED MATERIAL

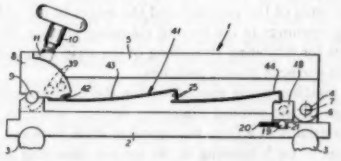
Franz Pürstinger, Brunlehnerstr. 11, A 4540 Bad Hall, and Siegfried Topf, Waldmüllerweg 24, A-4050 Traun, both of Austria

Filed Jun. 13, 1986, Ser. No. 874,279

Claims priority, application Austria, Jun. 13, 1985, 1770/85

Int. Cl.[4] B29C 55/18, 59/00, 47/12

U.S. Cl. 425—383 **18 Claims**



1. In a calibrator for a plate like extruded material, for a wall section composed of a body of plastic material, having an upper portion, a lower portion connectable with said upper portion and a gap between said upper and lower portions for receiving said body, said upper and lower portions being pivotally connected to each other on one side by a pivot bearing, the

improvement wherein a locking member is pivotally attached to one of said upper and lower portions and engageable with the other of said portions for locking said upper and said lower portions together.

4,685,880

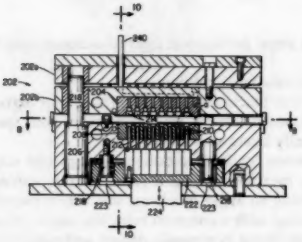
CUVETTE BELTS AND MANUFACTURE OF SAME

Jun-Ichi Meguro, Huntington Beach; Arne L. Solberg; William A. Stark, both of Costa Mesa, and Paul K. Hsei, Huntington Beach, all of Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Filed Jun. 18, 1985, Ser. No. 746,233

Int. Cl.[4] B30B *15/06*

U.S. Cl. 425—416 **6 Claims**



1. In a forming press apparatus in the manufacture of cuvette belts by cold forming plastic strip material with a series of regularly spaced transverse elongated pockets, said apparatus including:

first and second die members respectively defining first and second clamping surfaces and having openings formed in both said clamping surfaces corresponding to the positions of said pockets,

a plurality of forming punches mounted in said openings in said first clamping surface and movable through said openings in said second clamping surface with said punches spaced within said openings in said second clamping surface,

means for driving said clamping surfaces together to clamp said strip material therebetween.

means for advancing said forming punches from within said openings in said first clamping surface through said openings in said second clamping surface, after said surfaces have come together, to deform said strip material to form said pockets in the strip material by interaction between the ends of the punches and the edges of the corresponding openings in the second clamping surface, and

means for inhibiting stretching of the strip material over the end surfaces of said punches,

said punches being spaced within the corresponding openings in the second clamping surface whereby the strip material is in a free, unsupported state between the inner edge of each opening in the second clamping surface and end of the associated forming punch when the latter is advanced through said opening so as to permit stretching of said strip material to form said pockets,

the ends of the forming punches being convexly radiused to form the bases of the pockets with approximately flat profiles across their width in the direction along the length of the strip.

4,685,881

NOZZLE ASSEMBLY FOR INJECTION MOLDING

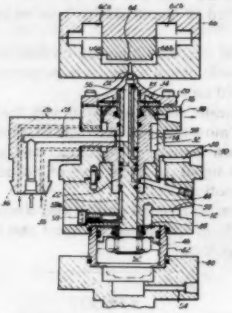
Nobuyoshi Sasaki, Yokohama, Japan, assignor to M.C.L. Co., Ltd., Japan

Continuation of Ser. No. 603,114, Apr. 23, 1984, Pat. No. 4,601,870. This application Jan. 17, 1985, Ser. No. 692,105

Claims priority, application Japan, Apr. 27, 1983, 58-72975; Apr. 27, 1983, 58-72976

Int. Cl.[4] B29C *45/22*

U.S. Cl. 425—562 **1 Claim**



1. A nozzle assembly for injecting a molten thermoplastic material through a sprue runner and into a plurality of mold cavities, said sprue runner and plurality of cavities being formed within a single mold, said assembly comprising a body which is heated to a temperature which is higher than the melting point of said thermoplastic material, a cylindrical bore in said body communicating through a single outlet port formed at one end of said cylindrical bore to at least two mold cavities, the body being formed with a first feed line for supplying the molten thermoplastic material and a separate second feed line for feeding high pressure air, plunger means slidably mounted within said cylindrical bore and being movable from a first position near said single outlet port to a second position remote from said single outlet port, the plunger being formed with a first passageway for passing the molten thermoplastic material and a separate second passageway for passing the high pressure air, and said first feed line communicating with said first passageway when said plunger is moved to said first position and said second feed line communicating with said second passageway when said plunger is moved to said second position, the pressure in said single outlet port being reduced when said plunger is moved from said first position to said second position.

4,685,882

PULVERIZED FUEL SLURRY BURNER AND METHOD OF OPERATING SAME

Chester S. Binasik, Palo Alto, and Steve B. Londerville, Half Moon Bay, both of Calif., assignors to Coen Company, Inc., Burlingame, Calif.

Filed Sep. 9, 1985, Ser. No. 774,207

Int. Cl.[4] F23M *9/00*

U.S. Cl. 431—182 **27 Claims**

1. A method of atomizing a fuel having a liquid component comprising the steps:

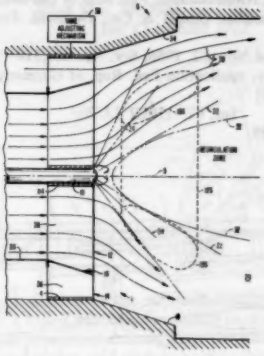
forming a flow of a first atomizing gas;

directing the fuel towards the atomizing gas flow in a direction approximately perpendicular thereto;

contacting substantially the entire periphery of the gas flow with the fuel to thereby shear the fuel into the gas flow, disperse it therein and form a fuel-atomizing gas mixture;

enveloping the mixture with a second gas rotating about a

flow axis of the mixture; and discharging the mixture with the rotating gas flow into a combustion zone;



whereby the rotating gas flow causes the mixture to spin about the flow axis and to diverge about the flow axis as it propagates into the combustion zone.

4,685,883

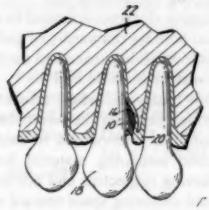
LOCAL DELIVERY OF CHEMOTHERAPEUTIC AGENTS FOR THE TREATMENT OF PERIODONTAL DISEASE

Gary R. Jernberg, 99 Navaho Ave. Ste. 102, Mankato, Minn. 56001

Continuation of Ser. No. 530,999, Sep. 12, 1983, abandoned. This application Jul. 26, 1985, Ser. No. 759,513

Int. Cl.[4] A61C *5/00*

U.S. Cl. 433—215 **7 Claims**



1. A method for local delivery of chemotherapeutic agents to localized sites in the mouth for treatment of periodontal disease, comprising the steps of:

(a) displacing gingival tissue away from the surface of the root portion of a tooth so as to form a vacuous cavity between the tooth and the tissue within a peridontal pocket;

(b) insertion of biodegradable, time-release microshapes encapsulating chemotherapeutic agents, into the vacuous cavity between the tooth and the tissue within the periodontal pocket; and

(c) allowing the displaced gingival tissue to return substantially to its orginial position for retention of the biodegradable, time-release microspheres in the periodontal pocket whereby the biodegradable, time-release microspheres will begin to degrade and release the chemotherapeutic agents at a localized site.

4,685,884

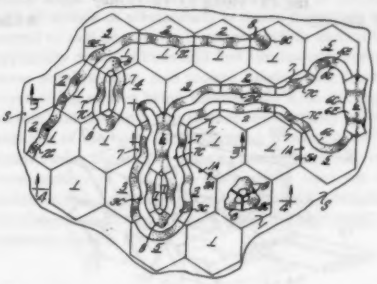
MEANS FOR SIMULATING A TOPOGRAPHICAL AREA

Kieran P. Rohan, 4014 SE. Howe, Milwaukie, Oreg. 97222

Filed Jan. 27, 1986, Ser. No. 822,845

Int. Cl.[4] G09B *25/06;* **A63F** *9/12*

U.S. Cl. 434—152 **10 Claims**



1. Means for simulating a geographical area and comprising in combination,

three-dimensional parts having edges adapted for abutment with an edge of another of said parts,

at least some of said parts additionally including a curved free edge and an inclined area contiguous with said curved free edge, and

at least some of said parts including a planar surface for superimposition of other of said parts.

4,685,885

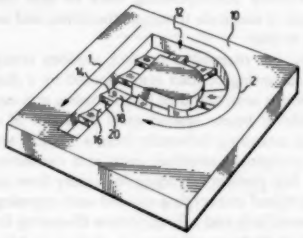
INSTRUCTIONAL PRINTING EQUIPMENT

John W. Maddocks, R.R. No. 2, Thorndale, Ontario, Canada

Filed Aug. 22, 1985, Ser. No. 768,277

Int. Cl.[4] G09B *11/04*

U.S. Cl. 434—164 **1 Claim**



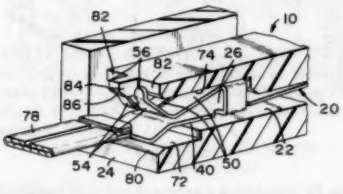
1. Instructional printing equipment for teaching the correct manner of printing letters and/or numerals comprising a set of letters and/or numerals each formed as a block with at least one groove forming the configuration of a letter or numeral concerned, each groove having an upper surface shaped to facilitate movement of a writing instrument along the groove in a preferred direction to be used when writing the letter or numeral concerned and to resist the movement of the writing instrument therealong in an opposite direction, said upper surface comprising a series of surface portions inclined upwardly in said preferred direction, each upwardly inclined surface portion being followed by a steeply downwardly inclined portion to resist movement of a writing instrument in said opposite direction, and each upwardly inclined portion being spaced from a preceding steeply downwardly inclined portion to provide an aperture to enable a writing instrument moved over the upper surface to pass through each aperture and consequently make a mark on a writing surface positioned beneath the letter or numeral concerned.

4,685,886

ELECTRICAL PLUG HEADER

Keith R. Denlinger, Lancaster; William J. Rudy, Jr., Annville, and Daniel E. Stahl, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 27, 1986, Ser. No. 879,715
Int. Cl.[4] H01R 13/11, 13/642
U.S. Cl. 439—55 8 Claims



1. An electrical connector assembly for mating with a mating connector, said mating connector including an array of male terminals having blade-liked contact sections extending forwardly from a mating face thereof, said assembly comprising housing means having a plurality of passageways extending therethrough from a mating face to a rear face thereof, and a like plurality of contact terminals secured in corresponding ones of said passageways and including tab receptacle contact sections at forward ends thereof disposed proximate said mating face to receive corresponding ones of said blade-like contact sections of said male terminals thereinto, said assembly characterized in that:

each of said tab receptable contact sections comprises a single beam spring contact arm opposed by a dual beam spring contact arm, said dual beam contact arm comprises two cantilever beams spaced apart by a slot of selected width and extending forwardly from a box-like section of said tab receptacle terminal, each said cantilever beam having a first portion extending forwardly from said box-like section and converging toward said opposing single beam contact arm and a front portion diverging from said opposing single beam contact arm, at least said front portions of said two cantilever beams being substantially spaced apart defining a forward portion of said slot;

the forward end of a first wall of each said housing passageway is proximate an associated said dual beam spring contact arm and concludes in a centrally disposed axial rib segment extending to said mating face of said housing and having a first tapered surface defining lead-in means for facilitating receipt of a corresponding said blade-like contact section of a said male terminal, said rib segment being situated in said forward portion of said slot between said front portions of said two cantilever beams; and

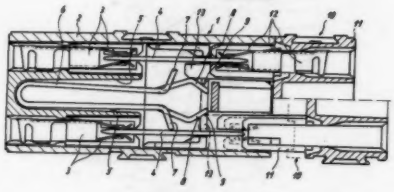
blade-proximate surfaces of said diverging front portions of said two cantilever beams being substantially coplanar with said first tapered surface of said rib segment, whereby a substantially continuous first lead-in means is provided by said first tapered surface and said diverging front portions which is especially adapted to receive thereinto a misaligned blade-like contact section of a said male terminal without stubbing.

4,685,887

ELECTRICAL CONNECTOR ARRANGEMENT WITH A SHORT-CIRCUIT BRIDGE

Walter Hanning, Hiddenhausen, Fed. Rep. of Germany, assignor to C.A. Weidmüller GmbH & Co., Detmold, Fed. Rep. of Germany

Filed Nov. 12, 1986, Ser. No. 930,510
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1985, 8531990[U]
Int. Cl.[4] H01R 13/703
U.S. Cl. 439—188 2 Claims



1. An electrical double plug and socket connector comprising

a socket component including

a first insulating material housing centered on an axis and having two axially spaced ends,

two metallic contacts arranged in said first insulating material housing, and

insulating material lugs mounted on said first insulating material housing and projecting substantially axially from one of said ends to a predetermined distance beyond said contacts;

a plug component guided on said socket component for axial movement between at least one inoperative and one operative position and including

a second insulating material housing having two spaced axial ends one of which faces said one end of said socket component in said positions and bounding a centrally located receiving space which is open toward said one axial end of said plug component, and

two metallic connecting elements arranged in said second insulating material housing outwardly of and projecting axially beyond said receiving space and each having an inwardly facing surface portion; and

a resilient short-circuit bridge including a substantially U-shaped spring arranged between the two connecting elements, predominantly accommodated in said receiving space of said second insulating material housing, and having two arms having respective end portions projecting axially out of said receiving space toward said insulating material lugs of said first insulating material housing to such an extent that said connecting elements project beyond said end portions of said arms by more than said predetermined distance,

said end portions of said arms having respective contact webs which respectively extend toward and resiliently contact the associated ones of said inwardly facing surface portions of said connecting elements in said inoperative position for the short-circuit bridge to provide a short-circuit connection between said connecting elements, and actuating portions which respectively extend into the path of movement of said two insulating material lugs for said insulating material lugs to move said contact webs resiliently away from said connecting elements as said plug component approaches said operative position thereof relative to said socket component to interrupt said short-circuit connection.

4,685,888

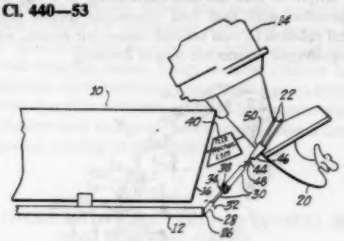
OUTBOARD MOTOR SUPPORT

Frank Brewer, 10470 SW. 203 Ter., Miami, Fla. 33189

Filed Mar. 18, 1985, Ser. No. 713,258

Int. Cl.[4] B63H 5/12

U.S. Cl. 440—53 2 Claims



1. An outboard motor support arm for being connected between a lower unit of an outboard motor and a boat trailer while said lower unit extends from the transom of a boat carried by said trailer, said support holding said motor in an angular position relative to said transom and allowing relative angular damping movement of said lower unit with respect to said transom and trailer, said movement for damping vibrations brought on by undulations in the surface being travelled by said trailer, said support arm comprising

lower means rigidly affixed to said trailer for connecting said support arm to said trailer;

upper means adapted to being removably fixed to said lower unit of said outboard motor;

shock absorber means connected between said lower means and said upper means for damping road bump induced movement of said outboard motor,

said shock absorber means includes a cylinder having an internal piston and a piston arm connected thereto and passing external to said cylinder, said piston and piston arm being slidable between an extended position and a retracted position relative to said cylinder, means being provided within said cylinder to dampen the motion of said piston;

said shock absorber means further including force means acting to retain said motor in a normal, at rest, position relative to said transom when said trailer is not acted upon by road bumps, and to return said motor to said normal position after said trailer is acted upon by road bumps.

4,685,889

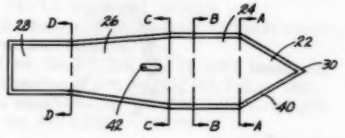
PROPELLER DRIVEN TUNNEL BOAT

Norman A. Nystrom, 7165 Buchanan Ct., Mentor, Ohio 44060

Continuation of Ser. No. 777,687, Sep. 19, 1985, abandoned. This application Dec. 23, 1986, Ser. No. 946,147

Int. Cl.[4] B63H 5/16

U.S. Cl. 440—69 6 Claims



1. A boat hull having a longitudinally extending tunnel formed on the underside thereof, said tunnel comprising a section of increasing transverse width in the direction of the stern of the boat, a section of decreasing transverse width in the direction of the stern of the boat, said decreasing transverse width section having oppositely disposed substantially parallel sides, a first section of substantially constant transverse width disposed between and interconnecting said increasing transverse width section and said decreasing transverse width section, said first substantially constant transverse width section being substantially rectangular in cross-section, said increasing transverse width section and said first substantially constant transverse width section each having a substantially flat surface thereon, the combination of said substantially flat surfaces defining a first plane obliquely disposed at a first pre-determined angle with respect to the keel line of the boat, and a second section of substantially constant transverse width connected to said decreasing transverse width section so as to be oppositely disposed from said first substantially constant transverse width section, said second substantially constant transverse width section being substantially semi-circular in cross-section and having a top surface substantially parallel to the keel line of the boat, said decreasing transverse width section transforming the surface defining said substantially rectangular cross-section of said first substantially constant transverse width section into the surface defining said substantially semi-circular cross-section of said second substantially constant transverse width section.

4,685,890

INFLATABLE LIFEJACKET

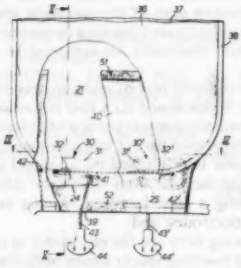
David V. Edwards, Billingshurst, England, assignor to R.F.D. Limited, Surrey, England

Filed Mar. 6, 1986, Ser. No. 836,718

Claims priority, application United Kingdom, Mar. 6, 1985, 8505779; Mar. 6, 1985, 8505780

Int. Cl.[4] B63C 9/12

U.S. Cl. 441—94 16 Claims



1. An inflatable lifejacket for providing buoyancy in water to a wearer of the lifejacket, comprising an inflatable buoyancy envelope and inflation means mounted within the envelope for inflation thereof, the inflation means comprising an inflation unit having a storage cylinder which stores inflation gas and which is openable by an operating arm which in an inoperative disposition extends alongside the cylinder in spaced relation thereto and which when pulled away from the cylinder in an operating stroke is operative to release gas from the cylinder and the envelope including a projecting tongue portion which receives the arm and which is so positioned in relation to an adjacent support portion of the envelope that, when the unit is assembled in a mounted position in the envelope with the arm located in the tongue portion, the cylinder is aligned with the adjacent support portion and is supported thereby when the arm is pulled to release gas from the cylinder.

4,685,891

METHOD OF ASSEMBLING AN INTEGRATED ELECTRON GUN SYSTEM

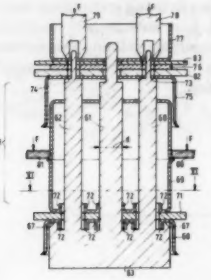
Antonius W. F. van der Heijden, and Petrus A. M. Fleuren, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 710,649, Mar. 11, 1985, abandoned. This application Jan. 29, 1987, Ser. No. 9,119

Claims priority, application Netherlands, Mar. 23, 1984, 8400927

Int. Cl.[4] H01J *9/18*

U.S. Cl. 445—36 **4 Claims**



1. A method for positioning relative to each other first and second pairs of spaced-apart electrodes of an integrated in-line electron gun for a color display tube, each electrode including a transversely-extending, plate-shaped part having central and first and second outer apertures for passing respective electron beams, each pair of electrodes including at least one cup-shaped electrode having its plate-shaped part symmetrically spaced from the corresponding plate-shaped part of the other electrode in the pair, said method comprising arranging the electrodes on an alignment device comprising a base from which extend central and first and second outer pins passing through respective ones of the electrode apertures, said pins having longitudinal axes lying in a common plane, characterized in that said electrodes are arranged on said device such that:

(a) the plate-shaped part of said cup-shaped electrode in the first pair is positioned on a first reference surface formed on an inwardly-stepped portion of at least one of the pins;

(b) the plate-shaped part of said cup-shaped electrode in the second pair is positioned on a second reference surface formed on the base from which the pins extend, thereby establishing a predetermined spacing between said cup-shaped electrodes; and

(c) the spacing between the electrodes in each pair is established by inserting spacer means between the plate-shaped parts of said electrodes.

4,685,892

TOY CONSTRUCTION SET

Diane C. Gould, El Segundo, and Robert R. Tucker, Redondo Beach, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Sep. 19, 1985, Ser. No. 777,655

Int. Cl.[4] A63H *33/08*

U.S. Cl. 446—109 **4 Claims**

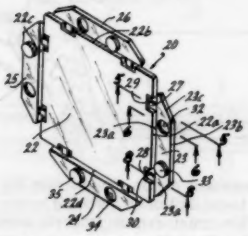
1. In a construction set for constructing three dimensional objects, a unitary construction element comprising:

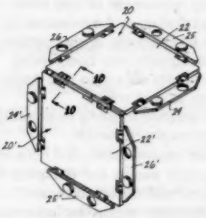
a generally planar main body portion having at least three sides of the same length;

spaced recesses in at least one of said sides having living hinges extending therefrom in a direction generally perpendicular to said at least one side;

a tab having a side thereof secured to the other end of said living hinges with said tab side in proximate spaced relation to said at least one side; and

first and second substantially identical aligned connector means on said tab each equally spaced from the midpoint of the length of said tab and each being of a cup-shaped configuration with said first connector means being in inverted relation to said second connector means, each of said cup-shaped connector means forming





(a) a pin portion extending from one surface of said tab, and

(b) a well portion in the opposite surface of said tab, said well portion being in axial alignment with said pin portion and being configured for frictional engagement with a corresponding one of said pin portions on another construction element having a like tab.

4,685,893

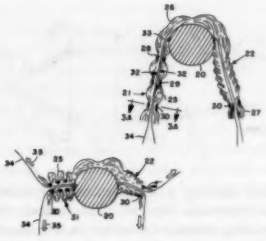
TOY DOLL OR ARTICLE WITH MANIPULATIVE APPENDAGE

Jerzy Perkitny, Cleveland Heights, and Edward G. Chanter, Lakewood, both of Ohio, assignors to Those Characters From Cleveland, Inc., Cleveland, Ohio

Filed May 27, 1986, Ser. No. 866,696

Int. Cl.[4] A63H *3/44*

U.S. Cl. 446—319 **30 Claims**



1. A toy comprising a toy body, a flexible appendage having a root end attached to said toy body and a free end remote from said toy body, said appendage being selectively movable from and between a compressed, ruffled condition and an extended, unruffled condition, means enabling such movement of said appendage comprising a flexible elongate element

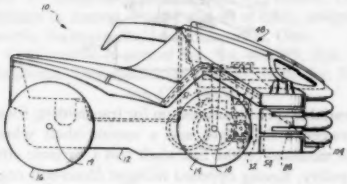
threaded longitudinally through said appendage, said appendage being slidable relative to said elongate element, means for retaining said flexible appendage selectively at and intermediate said compressed and extended conditions, said retaining means comprising holding means frictionally coacting with said elongate element for restraining a selected portion of said appendage against sliding movement relative to said elongate element, said holding means being slidable relative to said elongate element upon enduring force sufficient to overcome the frictional coaction between said holding means and said elongate element, said elongate element comprising a length of material having a string-like flexibility.

4,685,894

TOY VEHICLE WITH EJECTABLE FLYWHEEL SEAT AND OPENING GATES

Janos Beny, Vista, and Toshio Yamasaki, Long Beach, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jul. 3, 1986, Ser. No. 882,005
Int. Cl.[4] A63H *17/00, 17/273*
U.S. Cl. 446—435 **7 Claims**



1. A toy vehicle, comprising:

a body portion;

front and rear wheels rotatably mounted on said body portion, said front wheels being attached to an axle rotatably engaged to said body portion;

a tiltable box rotatably mounted on said body portion, said tiltable box having a shaft exiting through an aperture therein;

a flywheel seat removably mounted to the top of said body portion and removably engaging said tiltable box, said flywheel seat including a flywheel rotatably mounted therein;

gear means for operatively coupling said axle to said shaft;

two front gates rotatably mounted to said body portion; and

lever means for rotating said tiltable box and opening said front gates.

4,685,895

STABILIZER MECHANISM FOR USE IN DRILLING DEVIATED WELL BORES

James L. Hatten, Houston, Tex., assignor to Texas Eastern Drilling Systems, Inc., Houston, Tex.

Continuation of Ser. No. 571,704, Jan. 18, 1984, abandoned, which is a continuation of Ser. No. 232,147, Feb. 6, 1981, abandoned. This application Jan. 27, 1986, Ser. No. 823,090
Int. Cl.[4] E21B *17/10, 17/20*
U.S. Cl. 464—19 **6 Claims**

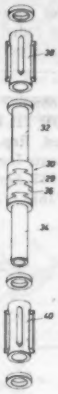
5. A stabilizer mechanism for transversing a short radius curve of a deviated well bore having a drill bit attached to its leading end and adapted to be attached at its trailing end to a flexible drill string; said stabilizer mechanism comprising:

a tubular mandrel including means for imparting limited flexibility to enable said mandrel to traverse the short radius curve of a deviated well bore and having a pair of end sections and an intermediate section between said pair of and sections;

a stabilizer sleeve positioned for relative rotative movement on each of said end sections to form spaced uphole and downhole sleeves adjacent opposed ends of said intermediate section; and

cooperating means between the mandrel and sleeves to limit axial movement of said sleeves on said end sections and permit rotation of said mandrel relative to said sleeves;

the outer surface of said sleeves defining a diameter greater than the outer diameter of any portion of said intermediate section of the mandrel thereby to allow the mandrel to



traverse the short radius without interference between the bore hole wall and the intermediate section; the outer diameters of the drill bit, downhole sleeve and uphole sleeve decreasing in size from the drill bit to the uphole sleeve with the downhole sleeve having an outer diameter of a size between the drill bit diameter and uphole sleeve diameter thereby to aid in controlling trajectory of the drill bit.

4,685,896

CLUTCH DISK WITH TORSIONAL DAMPER ASSEMBLY

Roger Carmillet; Michel Graton, both of Paris, and Michel Bacher, Domont, all of France, assignors to Valeo, Paris, France

Filed Aug. 1, 1985, Ser. No. 761,519
Claims priority, application France, Aug. 3, 1984, 8412292
Int. Cl.[4] F16D *3/14*
U.S. Cl. 464—68 **19 Claims**

1. A torsional damper device comprising at least two coaxial

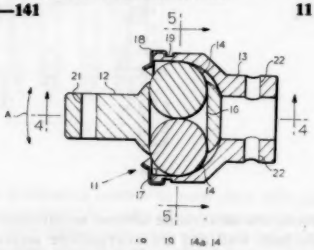
parts mounted for rotation relative to one another, torsion damping means operatively interposed between said coaxial parts, a bearing disposed radially between said two coaxial parts, said bearing comprising two separate bearing parts disposed one on each side of a diametral plane of the device, each of said separate bearing parts being locked axially in one of said coaxial parts and providing an axial bearing support for the other of said coaxial parts, each of said separate bearing parts having a radial tab inserted in a transverse groove in said one of said coaxial parts and a radial collar defining said axial bearing support for said other coaxial part, said tabs and said collars extending in opposite radial directions, and radial restraining means limiting radial separation of said bearing parts.

4,685,897

UNIVERSAL JOINT FOR TILT STEERING WHEEL

Werner Krude, Siegburg, Fed. Rep. of Germany, assignor to GKN Automotive Components Inc., Auburn Hills, Mich.

Filed Feb. 22, 1985, Ser. No. 704,400
Int. Cl.[4] F16D *3/20, 3/23*
U.S. Cl. 464—141 **11 Claims**



1. A power transmitting mechanical joint comprising, in combination:

a plurality of spherical balls;

an inner joint member comprising recess means therein, said recess means receiving said plurality of sphercial balls, said plurality of spherical balls being rollingly engaged by said recess means to permit each of said plurality of spherical balls to contact another of said plurality of spherical balls, the centers of said spherical balls lying in a plane that is perpendicular to the central axis of said inner joint member; and

an outer joint member having an opening that receives a portion of said inner joint member, said opening comprising a plurality of recesses extending thereinto, each of said plurality of recesses rollingly engaging one of said plurality of spherical balls;

said outer joint member of said inner joint member being subject to angular articulation with respect to one another to cause each of said plurality of spherical balls to roll in said recess means in said inner joint member and in said one of said plurality of recesses of said outer joint member that engages said each of said plurality of spherical balls;

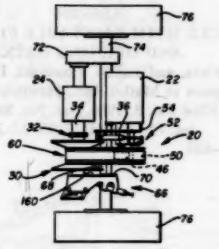
the configuration of each of said plurality of recesses of said outer joint member, over at least a major portion of its extent, along a plane that extends through said each of said plurality of recesses and the central axis of said outer joint member, being that of a curve of different radii, gradually decreasing from a maximum radius adjacent said opening of said outer joint member to a lesser radius as said each of said plurality of recesses extends into said opening, said centers of each of said plurality of spherical balls maintaining a substantially constant distance from said curve of different radii such that each of said plurality of spherical balls maintains substantially constant penetration into each of said plurality of recesses of said outer joint member to maintain contact between each of said plurality of spherical balls and another of said plurality of spherical balls and between each of said plurality of spherical balls and each of said recesses of said outer joint member that engages said each of said plurality of spherical balls throughout a range of articulation of said inner joint member with respect to said outer joint member that is substantially greater than 8° and to maintain free play operating characteristics in said joint throughout said range of articulation.

4,685,898

VARIABLE SPEED TRANSMISSION

William S. Wiens, 815 W. Kiowa Dr., Lake Kiowa, Tex. 76240

Continuation-in-part of Ser. No. 583,797, Mar. 1, 1984, Pat. No. 4,515,576, and a continuation of Ser. No. 234,436, Feb. 13, 1981, abandoned. This application May 3, 1985, Ser. No. 730,058
Int. Cl.[4] F16H *7/06*
U.S. Cl. 474—149 **8 Claims**



1. In a variable speed transmission for transmitting rotational forces between a first shaft and a second shaft wherein a sprocket is mounted on the first shaft and a variable effective diameter pulley, having opposed inclined chain-belt engaging surfaces, is mounted on the second shaft, an endless chain-belt assembly for transmitting rotational forces, said assembly having side edges thereon, comprising:

a first portion defining the edges of said chain-belt assembly and having a plurality of links defining a surface corresponding to the opposed inclined chain-belt engaging surfaces on said pulley; and

a second portion intermediate of the first portion having a plurality of links for engaging the teeth on said sprocket, said links being joined by a plurality of pins extending transverse to said links; and

a flexible shield mounted over said links and retained relative thereto by said pins wherein said flexible shield surrounds the links of said second portion of said chain-belt assembly and retains lubrication for said second portion and to prevent same for communicating to the first portion of the chain-belt assembly.

4,685,899

SOLID JACKET CENTRIFUGE

Vilim Cvitas, Leonding; Karl Faltejsek, Linz; Reinhart Hanke; Alois Janusch, both of Leoben, and Gerhard Larch, Marienkirchen, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Apr. 19, 1985, Ser. No. 724,963
Claims priority, application Austria, May 2, 1984, 1452/84
Int. Cl.[4] B04B *7/08*
U.S. Cl. 494—44 **20 Claims**

1. A solid jacket centrifuge comprising:

at least two rotatable and water impermeable mantles arranged concentrically with respect to each other and mounted for shifting movement along a longitudinal axis of the centrifuge;

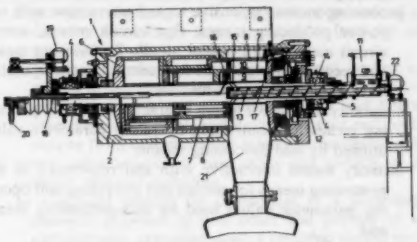
means for shifting the mantles independently in either direction along the longitudinal axis of the centrifuge;

means for charging material to be dewatered into the centrifuge;

means for discharging liquid from the centrifuge;

means, adjoining the mantles in a radial direction, for dis-

charging dewatered material and for cooperating with at least one mantle of the at least two mantles such that axial



movement of said at least one mantle effects opening of the means for discharging the dewatered material.

4,685,900

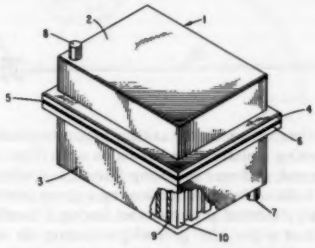
THERAPEUTIC DEVICE

Mark R. Honard, Mentor; Mark A. Holmes, Chardon, and Robert D. Jarrett, Painesville, all of Ohio, assignors to BioSpecific Technologies, Inc., Painesville, Ohio

Continuation-in-part of Ser. No. 499,989, Jun. 1, 1983, abandoned. This application Dec. 18, 1985, Ser. No. 809,857

Int. Cl.[4] A61M *37/00*

U.S. Cl. 604—5 **19 Claims**



1. A device for the treatment of a body fluid which comprises:

(a) a means for withdrawing a body fluid from a patient;

(b) a chamber means for receiving said body fluid having inlet and outlet means;

(c) positioned within said chamber means a non-radiation grafted biospecific polymer comprising a biocompatible polymer support, a spacer covalently bonded to said biocompatible support, and a biological or biologicals covalently bonded to said spacer such that the biological or biologicals extend away from the surface of said polymer support, which biospecific polymer will chemically bond specific pathological effectors or specific groups of pathological effectors carried by said body fluid to remove said specific effectors therefrom; and

(d) means for returning said body fluid to said patient.

4,685,901

GASTRO-JEJUNAL FEEDING DEVICE

Stephen K. Parks, San Jose, Calif., assignor to Medical Innovations Corporation, Milpitas, Calif.

Continuation-in-part of Ser. No. 670,381, Nov. 5, 1984. This application Nov. 5, 1985, Ser. No. 795,163

Int. Cl.[4] A61M *25/00*

U.S. Cl. 604—96 **12 Claims**

1. A device for feeding into a patient's jejunum, comprising:

a. an elongate, jejunal feeding tube, including an outer extension from the patient's stomach, the tube having a feeding inlet end mounted on the outer extension and a perforated outlet end positioned within the patient's stomach;

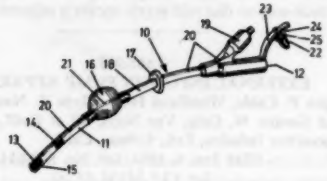
b. an inflatable balloon structure mounted around the tube and positioned near the outlet end of the tube;

c. an inflation valve mounted near the inlet end of the tube;

d. a valve line connected to the valve and providing an outlet port within the balloon structure, the valve line being positioned adjacent the feeding tube;

e. a closure plug for the feeding inlet and secured to the feeding tube by an integral band; and,

f. a locking ring positioned medially along the outer extension of the tube, and sized to frictionally engage the tube and slidably mounted therealong, and adjustable solely by frictional engagement with the tube to accommodate to the size of the wearer, the locking ring providing a plurality of perforations and spaced ridges to enable air circulation between the locking ring and patient's body; whereby,



i. when the balloon is deflated, the feeding tube may be inserted through a stomach placed stoma and into the patient's jejunum;

ii. when the balloon is inflated through the valve and valve line, it will secure the device within the patient's stomach and form a seal adjacent the stoma;

iii. securement of the ring to the tube being provided solely by frictional engagement therebetween, to secure the device within the patient's body and to prevent undesirable movement of the ring along the tube, whether in the dry state or when lubricated by body fluids, the locking ring being manually adjustable along the tube to accommodate to the size of the patient, and the balloon and ring both functioning to maintain the device in place in the patient;

iv. retraction of the ring being entirely against the force of frictional engagement to enable the stoma and adjacent areas to be cleaned; and,

v. when the balloon is deflated, retraction of the ring enables the device to be removed from the patient.

4,685,902

DISPOSABLE RESERVOIR CASSETTE

Floyd V. Edwards, Hopatcong, and Hasmukh Shah, East Windsor, both of N.J., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 525,921, Aug. 24, 1983, abandoned. This application Apr. 4, 1986, Ser. No. 848,901

Int. Cl.[4] B01D *46/00*

U.S. Cl. 604—153 **28 Claims**

1. A disposable reservoir cassette for use in delivering liquid medication to a user comprising:

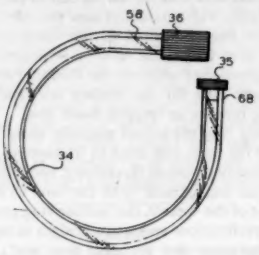
an elongate flexible reservoir;

an air-permeable, liquid-impermeable element at a first end of said reservoir;

access means at a second end of said reservoir for removable connection and fluid communication with an injection catheter; and

a rigid cassette housing containing said reservoir therein and including a substantially circular back-stop supporting said reservoir along the length of said reservoir, said housing including an opening to allow contact with said

reservoir by externally applied force adapted to compress said reservoir against said back-stop and drive any fluid contained therein in the direction toward said access



means, said housing including a transfer port and holding means for fixedly holding said reservoir adjacent to said back-stop so that said access means is adjacent to said port.

4,685,903

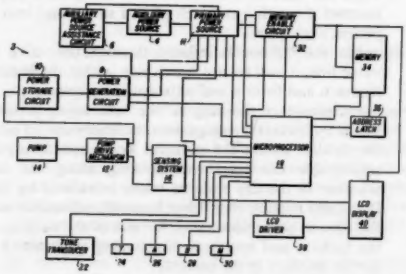
EXTERNAL INFUSION PUMP APPARATUS

Vaughn P. Cable, Woodland Hills; Clyde K. Nason, Valencia, and Gordon W. Culp, Van Nuys, all of Calif., assignors to Pacesetter Infusion, Ltd., Sylmar, Calif.

Filed Jan. 6, 1984, Ser. No. 568,614

Int. Cl.[4] A61M *37/00*

U.S. Cl. 604—154 **20 Claims**



1. A programmable fluid pumping apparatus comprising:

power producing means for supplying power to said apparatus comprising:

a first power source for supplying power to said apparatus, and

a second power source for supplying power to a portion of said apparatus only when said first power source cannot supply adequate power to said apparatus;

a first circuit means responsive to said power producing means for assisting said power producing means in producing necessary power levels;

a second circuit means responsive to an output of said power producing means for generating sufficient power for driving a pump drive means;

a third circuit means responsive to an output of said second circuit means for storing power generated by said second circuit means;

said pump drive means being responsive to an output of said third circuit means;

pump means mechanically connected and responsive to said pump drive means for pumping fluid from a fluid reservoir;

a first sensing means responsive to a stored power level of said third circuit means for determining when said stored power level equals or exceeds a predetermined value;

a second sensing means responsive to a power level of said power producing means for determining when the power level of said power producing means has dropped below a predetermined value;

processing means responsive to and interactive with said power producing means, first circuit means, second circuit means, third circuit means, first sensing means, and second sensing means for controlling the operation of said pumping apparatus;

a plurality of actuator means interactive with said processing means for controlling operating parameter values utilized by said processing means;

memory means interactive with and responsive to said processing means for storing and providing said operating parameter values used by said processing means; and

indicator means responsive to said processing means for providing selective indications of the operating status or condition of said apparatus.

4,685,904

NEEDLE CONSTRUCTION FOR AXILLARY PLEXUS BRACHIALIS ANESTHESIA

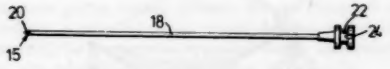
Peter Krebs, Am Lorettowäldchen 4, 7730 VS-Villingen, BRD, Fed. Rep. of Germany

Filed Jun. 21, 1985, Ser. No. 747,666

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1984, 3427951; Mar. 7, 1985, 3508013

Int. Cl.[4] A61M *5/00*

U.S. Cl. 604—164 **18 Claims**



1. Combination needle for axillary plexus brachialis anesthesia comprising a plastic tube having an open front end and an open rear end, said rear end being formed as a relatively large diameter hollow shaft portion having a given internal diameter, and a cylindrical steel mandrel having a handle adjacent one end and a partially ground puncturing tip adjacent its opposite end and which is inserted in said plastic tube so that its handle acts as a stop against said hollow shaft portion and its puncturing tip extends through said open front end a selective distance in relation to the stop acting positioning of said handle against said hollow shaft portion, said mandrel comprising a solid cylindrical puncturing tip of generally blunt end shape, which is without facets and cutting edges, and which includes a ground surface extending at an apex angle of at least 45° at the tip of the mandrel, and said handle having a plug-in socket for clamping action holding of a relatively miniature electrical connection of an electro-stimulator, said socket having an internal diameter which is relatively smaller than the corresponding internal diameter of said larger diameter hollow shaft portion.

4,685,905

IMPLANTABLE ARTERIAL CATHETER, ESPECIALLY MULTIDOSE INJECTION CATHETER

Hedwig Jeanneret nee Aab, La Chaux-de-Fonds, Switzerland, assignor to Clinical Plastic Products, La Chaux-de-Fonds, Switzerland

Filed May 19, 1986, Ser. No. 865,051

Claims priority, application Fed. Rep. of Germany, Feb. 20, 1986, 3605460

Int. Cl.[4] A61M *5/005*

U.S. Cl. 604—247 **5 Claims**

1. An implantable arterial catheter, especially a multidose catheter, comprising in combination

a multidose injection receptacle including

a shell which bounds a chamber having an open end, and

having an outlet port extending laterally from said shell and communicating with said chamber, said shell including an outwardly projecting fastening flange,

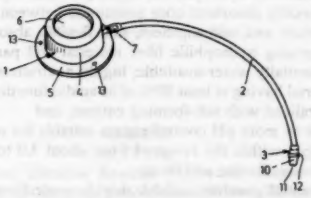
a piercable diaphragm spanning said open end of said chamber to sealingly separate the same from the exterior of the shell,

an elongated catheter tube having one end portion connected to said multidose injection receptacle and communicating with said chamber through said laterally extending outlet port, and having another end portion remote from said multidose injection receptacle; and

a safety valve secured to said other end portion of said catheter tube and including

an elongated conical tip component of a prearranged diameter disposed at said other end portion of said catheter tube, extending along a direction similar to that of said catheter tube, and having a flow orifice at an apex thereof,

a one-piece protective cap component of a predetermined diameter, and of paraboloidal shape surrounding said conical tip component and said other end portion of said catheter tube, being secured to said catheter tube, and having a free end provided with an additional flow orifice, said flow orifices extending coaxially along the aforesaid direction at a relatively small spacing from each other,



said conical tip component and said protective cap component having respective wall portions which bound the respective flow orifices and sealingly contact one another in the absence of a positive fluid pressure differential between the interior and the exterior of the respective component resulting from fluid passing from said outlet port through said catheter tube, but yielding to open the respective orifices sequentially so that the orifices form respective slot-like configurations in the presence of such positive pressure differential, while having a safe double return flow prevention effect when an administered fluid pressure is below a certain predetermined level, the so formed slots extending along said predetermined and prearranged diameters, but having lengths smaller than respective of said predetermined and prearranged diameters,

said protective cap component being slid onto and secured to said conical tip component, and including a paraboloidal cap head and a protective cap jacket formed with an outwardly arching, and peripherally extending fixation bulge, said protective cap jacket being adjacent to said paraboloidal cap head,

said conical tip component being formed of a material more yieldable than that of said protective cap component.

4,685,906

EYE-DROPS APPLICATION DEVICE

William F. Murphy, 5 Denson Dr., Edgewater, Fla. 32032

Filed Mar. 31, 1986, Ser. No. 845,948

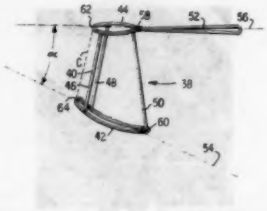
Int. Cl.[4] A61M *35/00*

U.S. Cl. 604—300 **12 Claims**

1. A device for administering eyedrops from an eyedropper dispenser, said device comprising a frame including:

a first annular closed ring member means configured to fit around the orbit of an eye of a user for supporting and adjusting the angle of inclination of the frame in the socket of the eye to achieve a desired angle about the eye out of the vertical for dispensing eyedrops into the eye when the user's head is in a tilted-back position other than a prone position, said first ring member means being disposed in a first plane;

a second annular closed ring member means for supporting an eyedropper dispenser while drops are dispensed into said eye, said second ring member means allowing variable angular adjustment of said dispenser when the user's head is in other than a horizontal back-prone position, said second ring member means being disposed in a second plane, said second plane being disposed at an acute angle



with respect to said first plane, such that said first and second ring members are in a spaced-apart angularly inclined configuration with respect to each other;

a rigid handle member means connected to and extending from said first ring member means, said handle member means extending in said first plane of said first ring member means, for allowing a user to adjust said first ring member means in the socket of the eye to achieve said desired angle about the eye; and

at least two discrete rod connecting members connected to said first and second ring member means for maintaining said first and second ring member means in said spaced-apart angularly inclined configuration.

4,685,907

DRESSING AND A METHOD FOR THE MANUFACTURE THEREOF

Magnus Agren, Göteborg, and Percy Nordqvist, deceased, late of Särö, both of Sweden by Ulla Nordqvist, Per Nordquist, Patrik Nordqvist, heirs, assignors to Molnlycke AB, Molnlycke, Sweden

Filed Feb. 19, 1985, Ser. No. 703,130

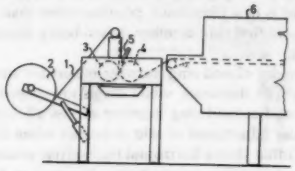
Claims priority, application Sweden, Feb. 17, 1984, 8400855

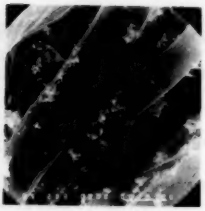
Int. Cl.[4] A61F *13/00*

U.S. Cl. 604—304 **9 Claims**

1. Air-permeable dressing for cleaning sores and stimulating the healing thereof, comprising a fibrous dressing blank formed from a multiplicity of individual fibers having zinc oxide bound to each one of the individual fibers of said blank throughout the thickness of said blank, in an amount of 1–10% by dry

weight of said dressing, said zinc oxide being bound to the individual fibers of said blank by polyvinyl pyrrolidone, said





polyvinyl pyrrolidone being present in an amount of 0.1-5.0% by dry weight of said dressing.

4,685,908

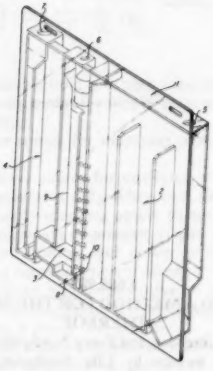
DEVICE FOR DETECTING INCREASED PRESSURE IN PLEURAL CAVITY

Robert J. Kurtz, New York, N.Y., assignor to BioResearch Ithaca Inc., Farmingdale, N.Y.

Continuation-in-part of Ser. No. 662,498, Oct. 18, 1984, Pat. No. 4,617,020. This application Dec. 26, 1985, Ser. No. 813,512

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—321 **5 Claims**



1. A drainage device adapted to be connected to the pleural cavity of a patient comprising a collection chamber, a seal chamber in communication with said collection chamber, said seal chamber having a large arm and a small arm, and means disposed along the length of the small arm of the seal chamber for detecting the level of fluid in the small arm of the seal chamber, and means for recording the lowest level of fluid in the small arm of the seal chamber whereby the maximum pressure reached in the pleural cavity of a patient can be determined.

4,685,909

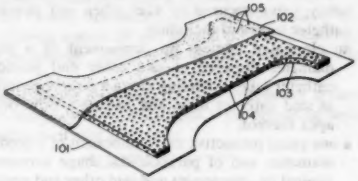
DISPOSABLE ABSORBENT ARTICLES

Ronald W. Berg, Fairfield, and Robert L. Stewart, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 734,424, May 15, 1985, abandoned. This application Aug. 22, 1986, Ser. No. 899,379

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—360 **39 Claims**



1. A disposable absorbent article useful for absorbing discharged body fluids while also reducing or preventing diaper rash, said absorbent article comprising

(A) a liquid impervious backing sheet;

(B) a relatively hydrophobic, liquid pervious topsheet;

(C) a flexible absorbent core positioned between said backing sheet and said topsheet, said flexible absorbent core comprising hydrophilic fiber material and particles of a substantially water-insoluble, highly neutralized hydrogel material having at least 50% of its acidic functional groups neutralized with salt-forming cations; and

(D) one or more pH control agents suitable for maintaining skin pH within the range of from about 3.0 to 5.5 in the presence of urine and feces;

said substantially water-insoluble, highly neutralized hydrogel particles and said pH control agents being non-uniformly distributed in distinct discrete zones within said absorbent article.

4,685,910

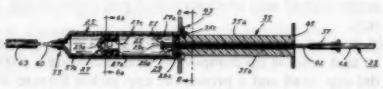
APPARATUS AND METHOD FOR DELIVERING SECONDARY FLUIDS TO A PATIENT USING AN INTRAVENOUS ADMINISTRATION SET FEEDING A PRIMARY FLUID

Russell J. Schweizer, Crystal Lake, Ill., assignor to Abbott Laboratories, North Chicago, Ill.

Filed Jan. 21, 1986, Ser. No. 820,852

Int. Cl.[4] A61M *5/315*

U.S. Cl. 604—218 **19 Claims**



1. In a fluid administration set for primary fluid whose flow rate is controlled by a pump, a device for infusing secondary fluid through the adminstration set without mixing with the primary and secondary fluids, said device comprising:

a chamber having first and second ends with said first end including an output port;

a sealing piston in said chamber comprising first and second portions;

a plunger integrally secured to said second portion of said sealing piston and extending beyond said second end of said chamber for manually positioning said sealing piston in said chamber between first and second positions wherein the piston is seated proximate to the first end of the chamber in said first position and proximate to the second end of the chamber in said second position;

means responsive to rotation of said plunger about its longitudinal axis for releasably locking said first and second portions of said sealing piston such that retraction of said plunger from said chamber while in a first rotational position causes said first and second portions of said sealing piston to move in tandem away from said first position and thereby draw secondary fluid into said chamber by way of said output port;

said means disengaging said first portion from said second portion in response to rotation of said plunger to a second rotational position such that further retraction of said plunger causes only said second portion to move away from said first end, thereby creating a sealed subchamber between said first and second portions;

means for locking said plunger so as to prevent further movement of said second portion; and

a flexible conduit communicating pressurized primary fluid from said administration set to said subchamber to cause primary fluid to fill said subchamber and push said first portion toward said first end of said chamber when said locking means is preventing movement of said second portion, thereby causing the secondary fluid to be directed downstream in the admininstration set and into the patient.

4,685,911

PATCH

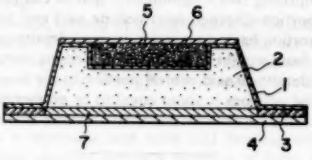
Yutaka Konno; Hiroitsu Kawata; Masayoshi Aruga; Takashi Sonobe, all of Saitama, and Mitsuo Mitomi, Tokyo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Feb. 8, 1985, Ser. No. 699,585

Claims priority, application Japan, Feb. 21, 1984, 59-31935

Int. Cl.[4] A61F *7/02*

U.S. Cl. 604—897 **3 Claims**



1. A transdermal patch comprising a solution or a suspension of a drug component wherein said drug component is selected from the group consisting of nicardipin hydrochloride, nifedipine, dipyridamole, formoterol fumarate, indenolol and γ-oryzanol, and when nicardipine hydrochloride is in solution, it is dissolved in:

(i) a mixed solvent of an aqueous urea solution, lactic acid and propylene glycol, or

(ii) a mixed solvent of an aqueous urea solution, benzyl alcohol, and propylene glycol, and when dipyridamole is in solution, it is dissolved in a mixed solvent of an aqueous urea solution, lactic acid and propylene glycol, and wherein said drug component is uniformly dispersed in a base mainly comprising a triglyceride of a vegetable saturated fatty acid having 12 to 18 carbon atoms together with a penetration enhancer; and wherein a heating element is disposed at the side of the patch opposite to the side thereof to be applied to the skin.

4,685,912

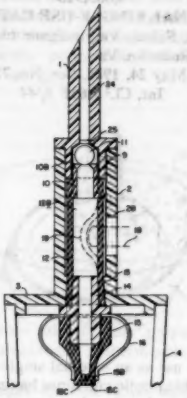
I.V. DRIP CHAMBER WITH BUILT-IN PUMP ACTIVATED BY EXTERNAL MEANS

J. Paul Jones, Glenmoore, Pa., assignor to Patent Research and Development Corp., Exton, Pa.

Filed Mar. 5, 1986, Ser. No. 836,503

Int. Cl.[4] A61M *5/14*

U.S. Cl. 604—247 **3 Claims**



1. In an intervenous infusion system, the combination of:

a source of fluid;

spike means having a fluid entrance passageway, the spike means being connected to said source to receive fluid therefrom;

means forming a hollow drip chamber to receive fluid from said spike means, the chamber having a top section and a bottom section;

a flexible tube to pass fluid from said spike to said drip chamber;

means including a one-way ball valve connecting one end of said flexible tube to said spike means, the one-way ball valve having an open condition where fluid can pass from said fluid entrance passageway into the flexible tube and a closed condition wherein passage of fluid therethrough is prevented;

means including a duck-bill valve connecting the opposite end of said flexible tube adjacent the top section of said drip chamber with the flexible tube extending away from the drip chamber and the duck-bill valve including a slit having an open condition wherein fluid can pass therethrough from the flexible tube into the drip chamber and a closed condition wherein passage of fluid therethrough is prevented;

spring means made of metal inside said drip chamber and engaging said duck-bill valve and exerting a closure force urging said slit to the closed condition and the spring means being disposed exterior to the duck-bill valve to avoid contact with fluid inside the valve and with fluid exiting from the slit;

means disposed between said valves and spaced from but positioned with respect to one side of said flexible tube to be interengaged therewith and support the one side when the opposite side of the tube is engaged by an actuator which operates to push the opposite side toward the one side and displace the fluid in the tube, one portion of the displaced fluid moving toward said one-way valve to cause the ball to close the valve and another portion of the displaced fluid moving toward said duck-bill valve to open said slit whereby a quantity of fluid enters said drip chamber;

the magnitude of said force generated by said spring means being great enough to maintain said closed condition

against the head pressure of the fluid between said slit and said source and low enough so that the pressure of said displaced fluid causes the slit to assume said open condition; and

said spike means, said drip chamber, said flexible tube, said one-way valve, said duck-bill valve, all being formed of plastic material.

4,685,913

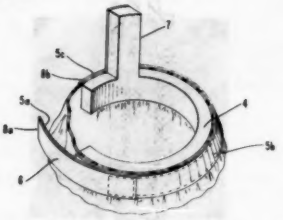
EXTERNAL SINGLE-USE CATHETER

Gerald W. Austin, Salem, Va., assignor to Professional Care Products, Inc., Roanoke, Va.

Filed May 24, 1985, Ser. No. 737,428

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—349 **5 Claims**



1. A device for use as an external single-use male catheter, comprising: a pliable plastic container having an interior space and provided with a closed end; an opening provided in said container opposite said closed end so as to receive a fluid in the interior space of said container; a first flexible strip of vapor-permeable material partially surrounding said opening and attached to a portion of said container defining said opening; a second flexible strip of material partially surrounding a portion of the container defining said opening and having means for cooperating with said first strip to selectively close and secure said container onto male gentialia; a tab of flexible material attached substantially perpendicular to said first strip and substantially parallel to an axis perpendicular to the plane of said opening; and means provided interiorly of said container for absorbing fluid.

4,685,914

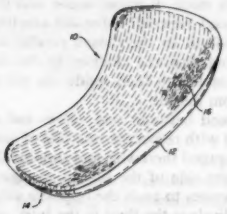
DISPOSABLE URINARY PAD

Dennis C. Holtman, Flemington, N.J., assignor to Personal Products Company, Milltown, N.J.

Continuation-in-part of Ser. No. 746,600, Jun. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 535,193, Sep. 23, 1983, abandoned. This application Aug. 12, 1985, Ser. No. 764,701

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—368 **30 Claims**



20. A disposable urinary pad comprising a liquid-impermeable, substantially flexible, relatively thin shell having a length from about 4 to about 12 inches, a width from about 2 to about 7 inches, and a depth from about 0.5 to about 2.5 inches,

a superstructure placed in and substantially filling said shell, said superstructure consisting essentially of a corrugated fibrous web of hydrophobic, wet resilient, dry resilient fibers, said web in its uncorrugated form, allowing liquid to pass through the web at a rate of at least about 20 cc/second; and

an absorbent medium comprised of superabsorbent material, hydrophilic fibers, a nonwoven web of hydrophilic fibers, wadding, tissue, peat moss, or mixtures thereof, in intimate contact with at least a portion of said superstructure and at least a portion of said shell,

said pad having a transverse recovery when wet of at least about 80% following compression of up to 25% of its width.

4,685,915

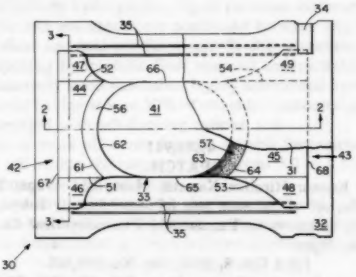
DISPOSABLE DIAPER HAVING DENSITY AND BASIS WEIGHT PROFILED ABSORBENT CORE

Margaret H. Hasse, Wyoming, and Mark J. Steinhardt, Loveland, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 6, 1984, Ser. No. 597,619

Int. Cl.[4] A61F *13/16*

U.S. Cl. 604—378 **19 Claims**



1. A disposable diaper comprising a liquid pervious topsheet, a liquid impervious backsheet, and an absorbent core disposed intermediate said topsheet and said backsheet, said absorbent core comprising two longitudinally spaced end portions and a central portion disposed intermediate said end portions, said central portion having a greater average density and a greater average basis weight than said end portions, the ratio of the average density of said central portion to the average density of said end portions is about equal to or greater than 2:1.

4,685,916

ELASTIC WAIST FOR DISPOSABLE ABSORBENT GARMENT

Kenneth M. Enloe, Neenah, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Filed Mar. 7, 1986, Ser. No. 837,475

Int. Cl.[4] A61F *13/16*

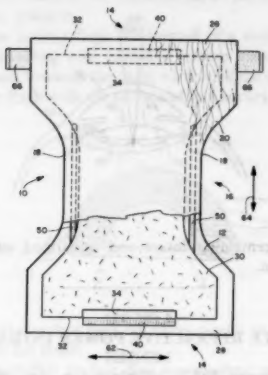
U.S. Cl. 604—385 A **23 Claims**

1. A disposable absorbent garment, comprising:

a. a covering sheet member having a waistband section at each longitudinal end thereof and an intermediate section interconnecting said waistband sections;

b. an absorbent body superposed in facing relation with said covering sheet member and having a notch section formed in at least one terminal, longitudinal edge thereof, said notch forming a recess having side edges which extend longitudinally toward an end margin of the garment; and

c. an elastomeric member attached to at least one of said covering sheet member waistband sections adjacent to



said absorbent body notch section for shirring a waistband of said garment.

4,685,917

STERILIZABLE VALVULAR SYSTEMS FOR FLEXIBLE CONTAINERS

Luciano Baldini, Tirano, Italy, and Alberto Siccardi, Lugano, Switzerland, assignors to Bieffe S.p.A., Italy

Filed Nov. 7, 1984, Ser. No. 669,008

Claims priority, application Italy, Nov. 14, 1983, 23693 A/83

Int. Cl.[4] A61B *19/00;* **A61M** *37/00*

U.S. Cl. 604—411 **7 Claims**

1. A valvular system for the extraction and/or addition of liquids held in a flexible sterilizable container of plastic material, comprising:

a housing body, formed of a single piece of flexible plastic film material different from that of the container, having a first wall adjacent to and sealed to said container, and a second wall parallel to said first wall and remote from said container; and

an elastomeric element contained within said housing body forming a hydraulic seal with said housing body, said elastomeric element having a plurality of faces, wherein the face of said elastomeric element remote from said container is spaced from the second wall of said housing body, thereby creating sterilizable chamber within said housing body, said sterilizable chamber having a width smaller than the width of said elastomeric element.

4,685,918

LIPID OSMOTIC PUMP

Gordon L. Amidon, Ann Arbor, Mich.; Takeru Higuchi, Lawrence, Kans., and Jennifer B. Dressman, Ann Arbor, Mich., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Feb. 1, 1985, Ser. No. 697,105

Int. Cl.[4] A61K *9/22, 9/32*

U.S. Cl. 604—892 **19 Claims**

1. A lipid osmotic pump, for the controlled delivery of a substantially water insoluble active agent into an aqueous environment, comprising:

(A) a core, comprising an admixture of:

(i) a beneficial amount of at least one substantially water insoluble active agent which is lipid soluble and/or lipid wettable;

(ii) a sufficient amount of at least one water immiscible lipid carrier, which is liquid at the temperature of intended use, to dissolve and/or suspend said active agent; and

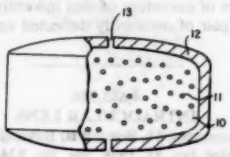
(iii) a sufficient amount of at least one osmotic agent to ensure release of said lipid carrier from the pump; and

(B) surrounded by a water insoluble wall;

(i) having a thickness of about 1 to 1000 microns;

(ii) which is preferentially wetted by said lipid carrier over an aqueous solution of said osmotic agent;

(iii) having a water permeability of about 1×10^{-18} to 4×10^{-13} cm^3 sec/g;



(iv) prepared from atleast some polymer permeable to waster but substantially impermeable to said osmotic agent; and

(v) having a means for said active agent to be released through said water insoluble wall;

(C) wherein at the temperature of use, the lipid carrier is liquid and retains the lipid soluble or lipid wettable agent in a dissolved or suspended state so that upon the dissolution of the osmotic agent in the imbibed water the lipid carrier and the dissolved or suspended active agent is released from the osmotic pump at a controlled rate.

4,685,919

ARTIFICIAL JOINT

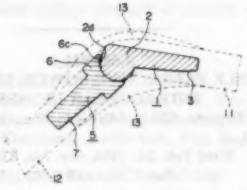
Shigeo Niwa; Kazuo Kondo, and Katsutoshi Betsuki, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Filed Mar. 14, 1986, Ser. No. 839,575

Claims priority, application Japan, Mar. 14, 1985, 60-36914[U]; Mar. 14, 1985, 60-36915[U]; Mar. 18, 1985, 60-38714[U]

Int. Cl.[4] A61F *2/42, 2/30*

U.S. Cl. 623—21 **10 Claims**



1. An artificial joint for joining a first bone and a second bone comprising:

a first member having a first shank portion and a first slidable portion having a flat surface, said first shank portion comprising a tapered bar having a substantially square cross section with each corner rounded and including a first end adapted for attachment to the first bone, a second end, and a surface extending from said first end flush with and lying in the same plane as said flat surface of said first slidable portion, said first shank portion having said first slidable portion disposed at said second end, said first slidable portion having a substantially cylindrical shape and hav-

ing a longitudinal axis that is substantially perpendicular to a longitudinal axis of said first shank portion; and

a second member having (1) a second shank portion including a first end and a second end, said first end of said second shank portion being adapted for attachment to the second bone, and (2) a second slidable portion, having a shape substantially of a rectangular parallelepiped, disposed at said second end of said second shank portion, said second slidable portion having a surface opposite said second shank portion including an inwardly curved surface having its curve along its longer sides, said inwardly curved surface having a concavity complementary to and in sliding contact with an outer surface of said first slidable portion of said first member, said concavity being defined by an inner surface curved in a direction perpendicular to a direction of curvature of said inwardly curved surface and by a pair of outwardly deflected opposite edge surfaces.

4,685,920

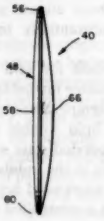
INTRAOCULAR LENS

Charles D. Fritch, Rte. 11, Box 239B, Bakersfield, Calif. 93308

Filed Jan. 31, 1986, Ser. No. 824,800

Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **5 Claims**



1. A lens implant having a curved side and a plano side comprising:

at least two arcuate ridges in continuous contact with and located along the periphery of said plano side for supporting the centermost portion of said implant in a spaced-apart relationship, and in which

each of said ridges has a variable height that varies continuously and gradually from a minimum height at each end to a maximum height at the centermost portion for and each ridge has an arcuate shape measured from the anterior side to the posterior side for reducing trauma to the iris by producing a camming surface without any flat spots on the ridges.

4,685,921

VARIABLE REFRACTIVE POWER, EXPANDABLE INTRAOCULAR LENSES

Gholam A. Peyman, 535 N. Michigan Ave., Apt. 3001, Chicago, Ill. 60611

Filed Feb. 24, 1986, Ser. No. 832,335

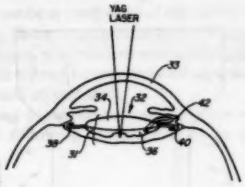
Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **25 Claims**

1. Intraocular lens for insertion inside the eye of a mammal comprising:

central lenticular means for refracting light entering the eye through the cornea before light passes to the retina, said central lentiular means comprised of a solid lens portion and a flexible, impermeable bag means portion connected thereto and collapsed upon itself and forming an inside and an outside; and,

tube means opening into said inside of said bag means of said central lenticular means and extending outwardly therefrom wherein said bag means can be expanded once said intraocular lens has been inserted inside the eye of a mammal by filling with a fluid passing through said tube means and entering said inside of said bag means whereby said flexible, impermeable bag means being disruptable to change said lens' refractive power and said solid lens



portion remaining intact and unharmed subsequent to disruption.

4,685,922

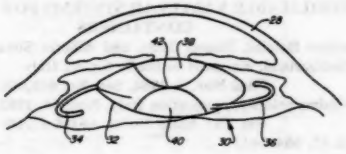
ALTERABLE REFRACTIVE POWER INTRAOCULAR LENSES

Gholam A. Peyman, 535 N. Michigan Ave., Apt. 3001, Chicago, Ill. 60611

Filed Jun. 25, 1986, Ser. No. 878,368

Int. Cl.[4] A61F *2/16*

U.S. Cl. 623—6 **14 Claims**



1. Intraocular lens for implantation inside the eye of a mammal comprising:

solid central lenticular means having a free standing shape retaining configuration throughout its solid form for refracting light entering the eye through the cornea before light passes to the retina, said solid central lenticular means having at least one chamber means therein and having at least one refractive, rupturable membrane means whereby said refractive, rupturable membrane means are rupturable subsequent to eye implantation thus permitting changing the refractive power of said intraocular lens while said solid central lenticular means substantially retains its free standing configuration.

4,685,923

HIP JOINT SOCKET

Robert Mathys, Bettlach, Switzerland, assignor to Robert Mathys Co., Bettlach, Switzerland

Continuation-in-part of Ser. No. 689,572, Jan. 7, 1985, abandoned. This application Mar. 10, 1986, Ser. No. 837,891

Claims priority, application Switzerland, Jan. 11, 1984, 121/84

Int. Cl.[4] A61F *2/34*

U.S. Cl. 623—22 **5 Claims**

1. A plastic artificial hip joint socket for adhesive-free installation, comprising:

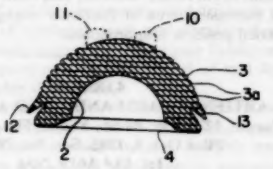
a socket body having an outer surface defining an equitorial plane;

two anchor plugs protruding from said outer surface; and

at least two supplementary barb-like anchor flaps each of which is integrally formed with said socket body upon said outer surface by an undercut, which obliquely extends beneath said outer surface in a direction away from said equitorial plane defined by said socket body, and

extends at an inclination relative to a line drawn tangent to said outer surface of said socket body for anchoring said socket body without the requirement of additional securing means, wherein;

said barb-like anchor flaps are formed of a resilient plastic material enabling said barb-like anchor flaps to be deformed back towards the outer surface of the socket body so as to be flush with the surface of said socket body when



said barb-like anchor flaps fail to encounter an attachment location at the bone;

each said barb-like anchor flap constituting an undercut flange forming a groove positioned between said undercut flange and said socket body, whereby said undercut flange is able to deform into said groove, enabling said barb-like anchor flaps to be flush with the surface of said socket body.

4,685,924

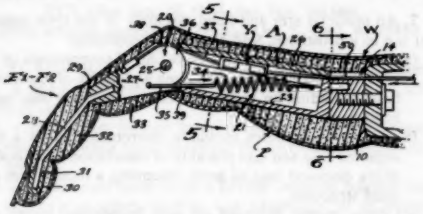
PREHENSILE THUMB AND FINGER PROSTHESIS

Peyton L. Massey, 860 Gretna Green, Los Angeles, Calif. 90049

Filed Oct. 4, 1985, Ser. No. 784,355

Int. Cl.[4] A61F *2/58*

U.S. Cl. 623—63 **19 Claims**



1. A prosthesis for replacing the human hand for attachment to a forearm socket; including;

a coupling member replacing the carpal portion of the hand and attached to the socket and having a transverse series of openings,

means in the form of an articulation unit carried by the coupling member and replacing the metacarpal portion of the hand and comprising at least one finger thereof and having a spring means biasing the at least one finger to a closed grip in yielding opposition to a thumb finger,

the transverse series of openings in the coupling member receiving the fixed fingers and at least one plug of the articulation unit for selective positioning and attachment of said finger and said articulation unit in the formation of right and left hand protsheses,

and the thumb finger and remaining fingers of the prosthesis at either side of the articulation unit and its at least one finger being fixedly carried by the coupling member.

4,685,925

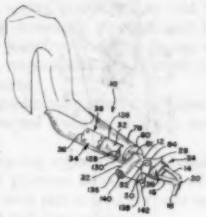
VOLUNTARY OPENING PREHENSION DEVICE

Dudley Childress, Wilmette, and John Strysik, Chicago, both of Ill., assignors to Northwestern University, Evanston, Ill.

Filed Oct. 22, 1984, Ser. No. 663,154

Int. Cl.[4] A61F *1/06*

U.S. Cl. 623—25 **26 Claims**



1. A voluntary opening prehension device comprising:

a pivot member;

a pair of finger members extending distally from said pivot member, at least one of said finger members being pivotally mounted thereon for selective separation and convergence of said finger members at their respective distal ends;

electric motor means for effecting said selective separation of said finger members;

closing means for biasing at least a portion of said finger members in contact with each other;

a battery member for supplying electrical power to said electric motor means;

field effect transistor driver means for actuating said electric motor means when supplied with a myopulse signal of a specified threshold strength or greater, so as to reduce the electric power necessary to operate said prehension device;

control means for supplying a myopulse to said field effect transistor driver in response to a myoelectric signal generated by the user;

said control means comprising a signal detector for detecting a myoelectric signal generated by the user;

a processor for processing said myoelectric signal into a myopulse which is directed to said field effect transistor driver for actuating said driver; and

a threshold detector for restricting actuating of said motor to those instances in which said myoelectric signal is of a specified minimum voltage strength or greater.

4,685,926

ARRESTABLE KNEE JOINT

Werner Haupt, Duderstradt-Tiftlingerode, Fed. Rep. of Germany, assignor to Otto Bock Orthopaedische Industrie Besitz- und Verwaltungs-Kommanditgesellschaft, Fed. Rep. of Germany

Filed May 28, 1986, Ser. No. 867,546

Claims priority, application Fed. Rep. of Germany, May 28, 1985, 8515598

Int. Cl.[4] A61F *2/64*

U.S. Cl. 623—43 **6 Claims**

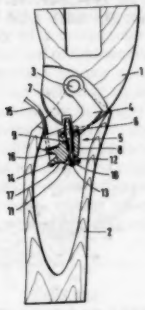
1. An arrestable knee joint, comprising:

a thigh member;

a lower leg member rotatably articulated on said thigh member to form a knee joint capable of rotating between an angular orientation of said members and an extended position of said members; and

means for releasably arresting said members in the extended position, said arresting means comprising a spring-loaded arresting element mounted in said lower leg member, means associated with said thigh member for engaging said arresting element when said members are in the ex-

tended position, a rocker arm assembly having a first arm attached to said arresting element and a second arm extending away from a rotational axis of the rocker arm



assembly on a side opposite from said first arm, and a Bowden wire inserted into said lower leg member and attached to said second arm of said rocker arm assembly.

4,685,927

BRAKED KNEE JOINT

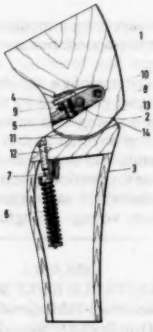
Werner Haupt, Duderstradt-Tiftlingerode, Fed. Rep. of Germany, assignor to Otto Bock Orthopaedische Industrie Besitz- und Verwaltungs-Komanditgesellschaft, Duderstadt, Fed. Rep. of Germany

Filed May 28, 1986, Ser. No. 867,730

Claims priority, application Fed. Rep. of Germany, May 28, 1985, 3519046

Int. Cl.[4] A61F *2/64*

U.S. Cl. 623—44 **3 Claims**



1. A braked knee joint, comprising:

a thigh member;

a lower leg member rotatably articulated to said thigh member to form a knee joint capable of rotating about an axis of rotation between a flexed orientation of said members and an extended position of said members;

means for permitting axial movement of said members with respect to one another;

a first braking surface at the lower end of said thigh member and a second braking surface at the upper end of said lower leg member, said braking surfaces having a generally circular contour and a constant radius of curvature with respect to said axis of rotation, said braking surfaces being adapted for frictional interengagement upon axial loading of the knee joint; and

means for gradually stopping rotational movement of the knee joint upon reaching said extended position, said stopping means comprising means associated with said first and second braking surfaces for gradually increasing frictional engagement of said members as said extended position is approached, wherein said means for gradually increasing frictional engagement comprises first and second front end pieces located adjacent to said first and second braking surfaces, said front end pieces each having a contour which extends at an increasing distance from said axis of rotation, said distance being greater than said radius of curvature, whereby said front end pieces provide an increasing area of frictional engagement as said extended position is approached.

4,685,928

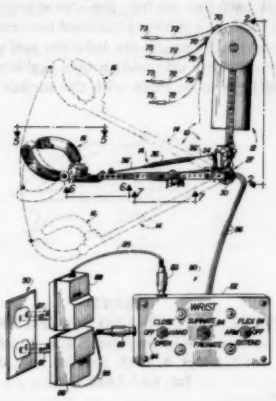
ARTIFICIAL ARM AND HAND ASSEMBLY

Ivan Yaeger, 1277 NW. 88 St., Miami, Fla. 33147

Filed Oct. 4, 1985, Ser. No. 784,082

Int. Cl.[4] A61F *2/54*

U.S. Cl. 623—64 **10 Claims**



7. An artificial arm and hand assembly of the type capable for use as a prosthesis, said assembly comprising:

(a) a foundation means for supporting of components of the assembly thereon and comprising a plurality of foundation bases including an upper arm base, a forearm base and a hand base,

(b) each of said bases movably interconnected to a next adjacent base and said plurality of foundation bases collectively disposed into an array resembling a human arm and hand structure,

(c) drive means mounted on said foundation means and interconnected in driving engagement with preselected ones of said foundation bases for movement thereof,

(d) said hand base comprising a plurality of digits attached thereto including at least one of said digits fixedly secured to said hand base and a remainder of said plurality of digits movably mounted thereon relative to said one fixedly secured digit,

(e) wherein said drive means comprises a first drive motor mounted on said upper arm base and movable therewith and drivingly interconnected to said forearm base for pivotable movement thereof relative to said upper arm base,

(f) said drive means further comprising a second drive motor mounted on said forearm base and movable therewith and drivingly interconnected to said hand base for rotational movement thereof relative to said forearm base,

(g) said drive means further comprising a third drive motor mounted on said hand base and movable therewith and drivingly interconnected to said movably mounted digits

for pivotal movement thereof relative to said one fixedly secured digit,

(h) activation means electrically connected, independently to each of said drive motors for independent and concurrent activation thereof,

(i) a first gear assembly disposed at an elbow joint and structured to define a pivotal interconnection between said upper arm base and said forearm base at correspondingly positioned ends thereof, said first gear assembly comprising a drive gear connected in directly driven relation to an output shaft of said first drive motor and drivingly engaging a plurality of regulating gears, said plurality of regulating gears drivingly engaging a driven gear fixedly secured to said correspondingly positioned end of said forearm base and movable therewith,

(j) a second gear assembly mounted on said forearm base for movement therewith and connected in driven engagement with said drive motor; a shaft meanns rotatably interconnected between said second gear assembly and said hand base for rotation of the latter relative to said forearm base,

(k) said second gear assembly comprising a drive gear connected in directly driven relation to an output shaft of said second drive motor and drivingly engaging a plurality of regulating gears, said plurality of regulating gears drivingly engaging a driven gear fixedly secured to said shaft means,

(l) said shaft means comprising an elongated configuration extending from driving interconnection with said second gear assembly at an intermediate location along said forearm base to a distal end of said shaft means drivingly attached to said hand base and secured thereto so as to rotate therewith

(m) whereby selected ones of said foundation bases and said movably mounted digits are movable independently and concurrently relative to on another.

4,685,929

TOTAL HAND PROSTHESES

Jacques Monestier, Valmondois, France, assignor to Compagnie Generale de Participations, S.A., Luxembourg, a part interest

PCT No. PCT/FR84/00212, § 371 Date Jun. 28, 1985, § 102(e) Date Jun. 28, 1985, PCT Pub. No. WO85/01437, PCT Pub. Date Apr. 11, 1985

PCT Filed Sep. 28, 1984, Ser. No. 744,094

Claims priority, application France, Oct. 5, 1983, 83 15850

Int. Cl.[4] A61F *2/54*

U.S. Cl. 623—64 **17 Claims**

1. A hand prosthesis or artificial hand with so called soft gripping comprising

A. a dorsal part formed from a rigid material having mechanical means for articulating the hand associated therewith;

B. a palmar part made from a flexible material adapted for ensuring gripping comfort and adaptation to an object being handled;

C. said dorsal and palmar parts detachably attached to each other;

D. said dorsal part including

a. a base plate having a dorsal face and a palmar face and forming a palm of the hand,

b. fingers including a forefinger, a middle finger, a ring finger, and a little finger, each of said fingers detachably attached to said base plate on its dorsal face,

c. each said finger including

(a) ball joint elements,

(b) three longitudinally juxtaposed elements forming a lower joint, a middle joint, and a top joint, articulated with respect to each other and to said base plate by respective said ball joint elements,

(c) said ball joint elements further comprising

pin means articulating said joints,

said pin means being positioned internally in said respective ball joint elements and spaced from a dorsal surface of said dorsal part,

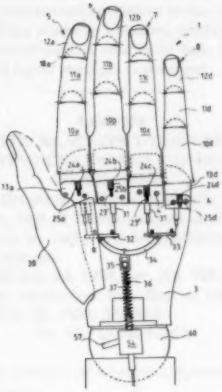
a hook means located in an internal distal end of said top joint,

a return spring connected to said hook means and passing internally through said top, middle, and lower joints over dorsal facing sides of said pin means respectively and beneath dorsal surfaces of said joints,

tubular guides supportedly mounted and attached to the internal walls of said top, middle, and lower joints,

traction spring segments in said tubular guides having spaced portions between ends of succeeding segments with said spaced portions occurring in zones of said ball joint elements,

a traction cable connected to said hook means and



guided internally of said joints, passing through said tubular guides within said traction spring segments, and in the rest position of the hand, said traction csable being free of guidance in said zones of said ball joint elements, and with the end of said traction cable away from said hook means passing through said base plate to said dorsal face of said base plate,

(d) force balancing means on said dorsal face of said base plate connected to a single traction cable means in control the articulation of said finger under the effect of a single traction force,

(e) each said traction cable from said finger connected to connecting means attached to said force balancing means,

(f) said force balancing means including a yoke type means and said connecting means to divide up said single traction force communicated bysaid single traction cable means into four decreasing forces from said forefinger to said little finger and initiate the movement of said fingers in an order from forefinger, middle finger, ring finger, to little finger,

(g) and a thumb detachably attached to said base plate.

4,685,930

METHOD FOR CLEANING TEXTILES WITH CYCLIC SILOXANES

Kenneth A. Kasprzak, Saginaw Township, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Continuation of Ser. No. 670,195, Nov. 13, 1984, abandoned. This application Feb. 27, 1986, Ser. No. 835,441

Int. Cl.[4] C11D *3/44, 7/50;* D06L *1/02, 1/04*

U.S. Cl. 8—139.1 9 Claims

1. A method for cleaning textiles which comprises applying a liquid composition consisting essentially of about 100 percent by weight of a cyclic siloxane selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane, and dodecamethylcyclohexasiloxane to a textile soiled with oil, grease or sebum, and removing from the textile a combination comprising cyclic siloxane and oil, grease or sebum.

2. A method for cleaning textiles which comprises applying to a soiled textile a composition consisting essentially of

(a) 30 to 70 percent by weight of a cyclic siloxane selected from the group consisting of octamethylcyclotetrasiloxane and decamethylcyclopentasiloxane, and

(b) 30 to 70 percent by weight of tetrachloroethylene; and removing from the textile a combination comprising soil, tetrachloroethylene and cyclic siloxane.

4,685,931

ACRYLATE DISPERSION AND ITS USE FOR THICKENING HYDROGEN PEROXIDE PREPARATIONS

Ludwig Schieferstein, Wuppertal; Detlef Hollenberg, Hilden, and Norbert Maak, Neuss, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 13, 1985, Ser. No. 808,591

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1984, 3445549

Int. Cl.[4] A61K *7/13, 7/135;* C08L *31/00, 33/06*

U.S. Cl. 8—406 24 Claims

1. An aqueous dispersion having a solids content of from about 5 to 30% by weight of a copolymer of ethyl acrylate, methacrylic acid, acrylic acid and as a crosslinking agent a polyethylenically unsaturated monomer, said copolymer consisting essentially of

from about 50 to 60% by weibht of ethyl acrylate

from about 30 to 40% by weight of methacrylic acid

from about 5 to 15% by weight of acrylic acid and

from about 0.02 to 0.04% by weight of said polyethylenically unsaturated copolymerizable monomer.

13. A hydrogen peroxide preparation for use as a developer dispersion for oxidative hair dyes or for hair bleaches, comprising from about 1 to 20% by weight of hydrogen peroxide and from about 1 to 5% by weight of the copolymer dispersion of claim 1, said preparation having a pH-value of from about 2 to 5.

4,685,932

METHOD FOR CONTROLLING ISOTHIAZOLONE ANTIMICROBIAL CONTENT OF FIBERS

Lawrence J. Guilbault; Thomas C. McEntee, both of Topsfield, and Judith L. Koob, Danvers, all of Mass., assignors to Morton Thiokol, Inc., Chicago, Ill.

Continuation-in-part of Ser. No. 657,119, Oct. 3, 1984, Pat. No. 4,624,677. This application Apr. 3, 1986, Ser. No. 847,800

The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.

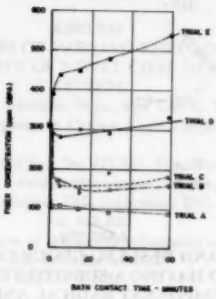
Int. Cl.[4] D06P *5/00;* D02G *3/00*

U.S. Cl. 8—490 9 Claims

1. A method for obtaining a desired antimicrobial agent concentration in a fiber while passing said fiber through a liquid medium, comprising:

providing a fiber containing an initial concentration of the antimicrobial agent 4,5-dichloro-2-cyclohexyl-3-isothiazolone that is essentially homogenously distributed throughout the fiber cross-section;

passing said fiber through a liquid medium which contains the same antimicrobial agent that is contained in said fiber,



said antimicrobial agent in said liquid medium being controlled in a concentration relative to the initial concentration in said fiber whereby a desired, predetermined antimicrobial concentration in said fiber following its passage through said liquid medium is obtained.

4,685,933

CONCENTRATED REACTIVE DYESTUFF SOLUTIONS CONTAINING CYANAMIDE COMPOUND AS STABILIZER

Joachim Wolff, Bergisch-Gladbach; Karlheinz Wolf, and Werner Marschner, both of Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

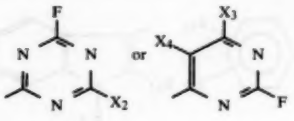
Filed Jun. 24, 1985, Ser. No. 748,267

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1984, 3425813; Feb. 13, 1985, 3504964

Int. Cl.[4] C09B *67/44*

U.S. Cl. 8—527 3 Claims

1. An aqueous solution of a reactive dyestuff with reactive groups of the formula



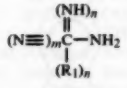
wherein

X_2=Cl, F, NH_2, NHR^2, OR^2, CH_2R^2, SR^2

X_3=Cl, F, CH_3

X_4=Cl, F

and wherein R^2=C_1-C_4-alkyl, optionally substituted by OH, SO_3H or COOH containing 7–35% by weight of said reactive dyestuff, 0–30% by weight of lower aliphatic or cyclic amides, lower aliphatic sulphoxides, dimethylsulphone, diethyl-sulphone, sulpholane, thiourea and urea and their derivatives, and 0.1–15% by weight of a compound of the formula



(1)

where

R_1 = —NH—C≡N,

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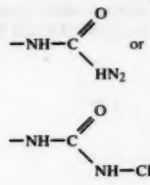


where
n=0 and m=1 or
n=1 and m=0.

4,685,934

MONO- AND DI-SULFO GROUP CONTAINING COMPOUND HAVING A SUBSTITUTED PYRAZOLYL DIAZO COMPONENT RADICAL AND THEIR USE

Francois Benguerel, Oberwil, Switzerland, and Roland Mislin, Village-Neuf, France, assignors to Sandoz Ltd., Basel, Switzerland

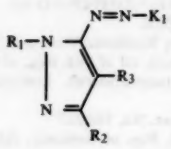
Filed Jul. 12, 1985, Ser. No. 754,533

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1984, 3426069

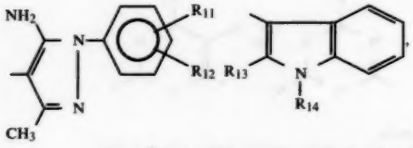
Int. Cl.[4] C09B *29/036, 29/09, 29/30, 29/36*

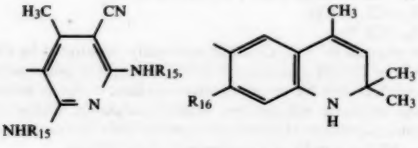
U.S. Cl. 8—684 **20 Claims**

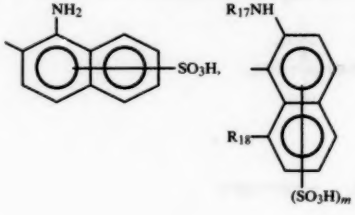
1. A compound of the formula



or a salt thereof each cation of which is independently a non-chromophoric cation,
wherein
K_1 is







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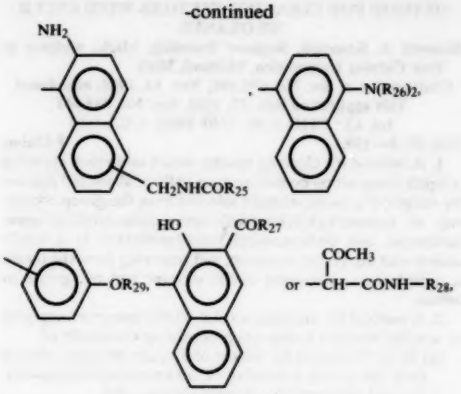


wherein
R_{11} is hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, chloro, bromo or sulfo,
R_{12} is hydrogen, C_{1-4}alkyl, C_{1-4}alkoxy, chloro or bromo,
R_{13} is methyl or phenyl,
R_{14} is hydrogen or C_{1-4}alkyl,
each R_{15} is independently hydrogen, C_{1-4}alkyl or C_{1-4}alkyl monosubstituted by hydroxy, chloro or cyano,
R_{16} is hydrogen, methyl or —$NHCOCH_3$,
R_{17} is hydrogen; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy; phenyl or phenyl substituted by 1 to 3 substituents selected from chloro, C_{1-4}-alkyl, C_{1-4}-alkoxy and sulfo,
R_{18} is hydrogen or hydroxy,
R_{25} is C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by chloro, cyano or methoxy; phenyl or phenyl monosubstituted by chloro, methyl, methoxy, cyano or —$CONH_2$,
each R_{26} is independently hydrogen, C_{1-4}alkyl or C_{1-4}alkyl monosubstituted by hydroxy, cyano, chloro or methoxy,
R_{27} is hydroxy or phenylamino,
R_{28} is C_{1-4}alkyl; phenyl; phenyl substituted by 1 or 2 substituents selected from chloro, methyl, methoxy and sulfo; phenyl(C_{1-4}alkyl) or phenyl(C_{1-4}alkyl) the phenyl group of which is substituted by 1 or 2 substituents selected from chloro, methyl, methoxy and sulfo, R_{29} is hydrogen or C_{1-2}alkyl, and m is 0 or 1,
R_1 is C_{1-6}alkyl; C_{1-6}alkyl substituted by 1 or 2 substituents selected from chloro, cyano, hydroxy, C_{1-4}alkoxy, phenyl and phenyl substituted by 1 or 2 substituents selected from chloro, C_{1-4}alkyl, C_{1-4}alkoxy, carboxy, sulfo, —SO_2NH_2 and —$NHCOCH_3$; C_{5-7}cycloalkyl; C_{5-7}cycloalkyl substituted by 1 to 3 C_{1-4}alkyl groups; phenyl; phenyl substituted by 1 to 3 substituents selected from chloro, C_{1-4}alkyl, C_{1-4}alkoxy, —$NHCOCH_3$ (maximum of 1), carboxy (maximum of 1), sulfo (maximum of 1) and —$SO_2NR_7R_8$ (maximum of 1); 1- or 2-naphthyl or 1- or 2-naphthyl substituted by sulfo,
wherein
each of R_7 and R_8 is independently hydrogen; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy or phenyl; cyclohexyl; phenyl or phenyl monosubstituted by chloro, methyl or methoxy, or
—NR_7R_8 is a 5- or 6-membered saturated or unsaturated ring containing 1 or 2 hetero atoms,
R_2 is hydrogen; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy, chloro, cyano, C_{1-4}alkoxy, phenyl or phenyl substituted by 1 or 2 substituents selected from chloro, methyl, methoxy, sulfo and —SO_2NH_2; C_{1-4}alkoxy; cyano; phenyl; phenoxy; or phenyl or phenoxy monosubstituted by chloro, methyl, methoxy or sulfo, and
R_3 is cyano, —$CONH_2$, —$COOR_4$, sulfo or —$SO_2NR_5R_6$,
wherein

R_4 is hydrogen, C_{1-4}alkyl, phenyl or phenyl (C_{1-4}alkyl), and

each of R_5 and R_6 is independently hydrogen; C_{1-4}alkyl; C_{1-4}alkyl monosubstituted by hydroxy or phenyl; cyclohexyl; phenyl or phenyl monosubstituted by chloro, methyl or methoxy, or

—NR_5R_6 is a 5- or 6-membered saturated or unsaturated ring containing 1 or 2 hetero atoms,

with the provisos that (i) the total number of sulfo groups is 1 or 2, and (ii) in any hydroxy-substituted alkyl group attached to a nitrogen atom, the hydroxy group is attached to a carbon atom other than the carbon atom attached to the nitrogen atom.

19. A process for dyeing or printing an anionically dyeable substrate comprising applying to an anionically dyeable substrate a compound according to claim 1 as dyeing or printing agent.

4,685,935

PROCESS FOR PRODUCING PURE MAGNESIUM SULPHITE

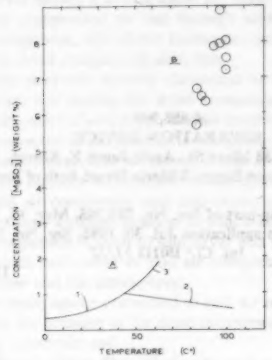
Stanislav Najmr, Prague; Zdenek Jerman, Usti n/L, and Jaroslav Kralicek, Prague, all of Czechoslovakia, assignors to Vysoka Skola chemicko-technologicka, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 744,779, Jun. 14, 1986, abandoned, which is a continuation-in-part of Ser. No. 451,866, Dec. 12, 1982, abandoned. This application Jun. 26, 1986, Ser. No. 879,343

Claims priority, application Czechoslovakia, Dec. 21, 1981, 9633-81

Int. Cl.[4] C01F *5/42*; C01D *5/16*

U.S. Cl. 23—304 **10 Claims**



1. A process for producing pure magnesium sulphite from crude crystalline magnesium sulphite, comprising the steps of

preparing a suspension containing raw magnesium sulphite hexahydrate in a fluid selected from the group consisting of water and a magnesium sulphate solution, to form a first flow;

rapidly heating the first flow to above 80° C. in less than 10 seconds by rapidly introducing at least one water-containing phase to the first flow as a second heat-supplying flow, to form a resulting flow comprising a metastable supersaturated solution of from 2 to 25 percent by weight of magnesium sulphite said second heat-supplying flow being at least one water-containing phase selected from the group consisting of water, water vapor, a solution remaining after crystallization of pure magnesium (II) sulphite from the metastable solution, aqueous magnesium sulphite, aqueous magnesium hydrogen sulphite, aqueous magnesium sulphate, and a combination thereof;

separating a resulting solid water-insoluble fraction from the resulting flow; and

recrystallizing pure magnesium (II) salt from the resulting flow.

4,685,936

METHOD OF VARYING RHEOLOGY CHARACTERISTICS OF NOVEL COAL DERIVED FUEL SYSTEM

Edmond G. Meyer, Laramie, Wyo., and Lee G. Meyer, Englewood, Colo., assignors to Carbon Fuels Corporation, Englewood, Colo.

Continuation-in-part of Ser. No. 427,937, Sep. 29, 1982, Pat. No. 4,475,924, which is a continuation-in-part of Ser. No. 247,382, Mar. 24, 1981, abandoned. This application Oct. 9, 1984, Ser. No. 658,880

The portion of the term of this patent subsequent to Oct. 9, 2001, has been disclaimed.

Int. Cl.[4] C10L *1/32*

U.S. Cl. 44—51 **19 Claims**

1. A method of varying the rheology of a combustible, substantially non-polluting, fluidic fuel system comprising a portion of a particulate coal char dispersed in an amount of a liquid material effective to produce a transportable, liquid/-solid mixture, wherein said liquid material is at least partially derived from the pyrolysis of coal comprising the step of varying the viscosity of said liquid material.

4,685,937

COMPOSITE ABRASIVE PARTICLES FOR MAGNETIC ABRASIVE POLISHING AND PROCESS FOR PREPARING THE SAME

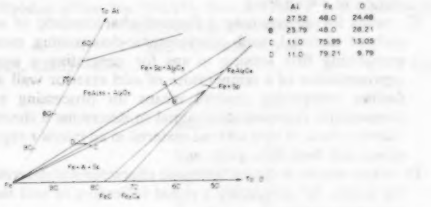
Saburo Hori, and Nobuhiro Watanabe, both of Iwaki, Japan, assignors to Kureha Chemical Industry Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1986, Ser. No. 856,726

Claims priority, application Japan, Apr. 30, 1985, 60-91197

Int. Cl.[4] C09C *1/68*

U.S. Cl. 51—309 **5 Claims**



1. Composite abrasive particles for use in magnetic abrasive polishing in which three phases of corundum-phase alumina, α-iron and iron-alumina spinel are detected by the powder X-ray diffractometry and which contain 48 wt % or more of iron and 11 wt % or more of aluminum.

4,685,938

APPARATUS AND METHOD FOR THE DETERMINATION OF SORPTION BED CHARACTERISTICS

Michael D. Oliker, Amesbury, Mass., assignor to NERA Company, Amesbury, Mass.

Filed Sep. 18, 1985, Ser. No. 777,162

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—20 **27 Claims**

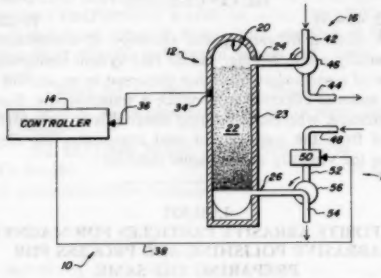
1. In a method of operating a sorption treatment apparatus, said apparatus including a sorption vessel having an exterior wall, a fluid feed entrance, and a fluid product exit, said sorp-

tion vessel having a sorbent material disposed in an interior fluid flow path defined by said feed entrance and said product exit, said sorbent material being in thermal communication with said exterior wall, said sorbent material being of the type used for the reduction of sorbate concentration in a feed fluid, said method including cycling the sorbent material through a sorption stage, wherein a feed fluid is passed through the material and a fluid product of reduced sorbate concentration is collected at the product exit, and a thermal regeneration stage, wherein a regenerant fluid is passed through the material to produce a fluid waste of greater sorbate concentration, the improvement comprising

generating a signal representative of a temperature of said exterior wall,

processing said exterior wall temperature-representative signal to determine therefrom a thermal characteristic of sorbent material in an interior region along said fluid flow path, and

generating a signal representative of said thermal characteristic.



14. An apparatus for the sorption treatment of fluids, said apparatus comprising

A. a sorption vessel having an exterior wall, a fluid feed entrance, and a fluid product exit,

B. a sorbent material disposed within said sorption vessel and in thermal communication with said exterior wall, said sorbent material being disposed along a fluid flow path defined by said feed entrance and said product exit, and being of the type suitable for reducing sorbate concentration in a feed fluid,

C. means for determining a thermal characteristic of said sorbent material, said characteristic-determining means comprising first sensing means for generating a signal representative of a temperature of said exterior wall and further comprising control means for processing said temperature representative signal to determine a thermal characteristic of said sorbent material in an interior region along said fluid flow path, and

D. output means in circuit with said characteristic-determining means for generating a signal indicative of said thermal characteristic.

4,685,939

PRODUCTION OF OXYGEN ENRICHED AIR

Wilbur C. Kratz, Macungie, and Shivaji Sircar, Wescosville, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 19, 1985, Ser. No. 713,503

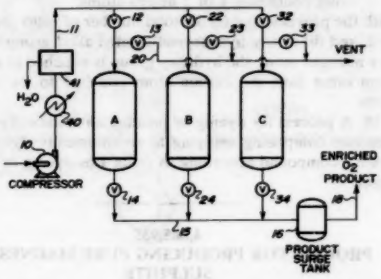
Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—25 **11 Claims**

1. The method of obtaining from ambient air a product stream having a moderately enriched oxygen concentration, which comprises the steps of:

(1) introducing the feed air into a closed bed of adsorbent selective in retention of nitrogen to increase the pressure in that bed from atmospheric to higher level first pressure of at least 1.5 atmospheres and not in excess of about 10 atmospheres,

(2) then immediately upon reaching said first pressure stopping introduction of feed air at the first pressure and reducing the bed pressure from said first pressure to an intermediate level second pressure which is above atmospheric but less than 0.75 times the first pressure by withdrawing from the bed and recovering as product a gas which is enriched in oxygen in the range of 23 to 50% by volume, said withdrawal being carried out in a flow direction concurrent with that of initial introduction of feed air into the bed,



(3) and immediately upon reaching said second pressure venting the bed to restore atmospheric pressure therein, said venting being carried out in a flow direction counter to that of said withdrawal of oxygen enriched product gas.

4,685,940

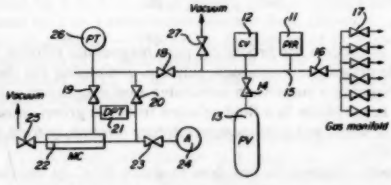
SEPARATION DEVICE

Abraham Soffer, 38 Moav St., Arad; Jacob E. Koresh, 10 Zeela Street, and Shlomo Saggy, 3 Moria Street, both of Beer Sheva, all of Israel

Continuation-in-part of Ser. No. 588,745, Mar. 12, 1984, abandoned. This application Jul. 30, 1985, Ser. No. 760,529

Int. Cl.[4] B01D *53/22*

U.S. Cl. 55—158 **11 Claims**

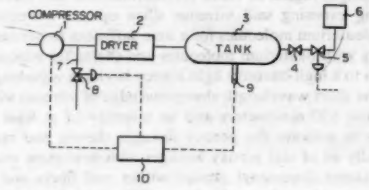


1. A carbon membrane for separating two gases having different size molecules in a range of 2.5 Å to 5.0 Å, wherein the molecules of each gas differ from one another in size by an amount not greater than 10%, said membrane having pores of a preselected size which also is in the range of 2.5 Å to 5.0 Å and which is intermediate the molecule sizes of the two gases to be separated, and said membrane having a pore size distribution which is such that the membrane has no significant number of pores which are 10% or greater in size than the smaller of the molecule sizes of the two gases.

4,685,941
COMPRESSED AIR SUPPLYING DEVICE

Kazuo Sato, Kanagawa, Japan, assignor to Tokico Ltd., Kawasaki, Japan

Filed Nov. 19, 1985, Ser. No. 799,738
Claims priority, application Japan, Nov. 20, 1984, 59-176043[U]
Int. Cl.[4] B01D *53/26*
U.S. Cl. 55—163 1 Claim



1. A compressed air device for supplying compressed air to pneumatic equipment, said compressed air device comprising:

an air compressor for compressing air, said air compressor having an outlet through which the compressed air is fed;

a dryer connected to said outlet of said air compressor, said dryer having a drying agent for removing moisture from the compressed air fed through said outlet of said air compressor, said dryer having an outlet through which the dried compressed air is fed;

an air reservoir directly connected to said outlet of said dryer for storing the dried compressed air fed through said outlet of said dryer, said air reservoir having an outlet connected to the pneumatic equipment through which the dried compressed air stored in said air reservoir is fed;

a valve connect to said outlet of said air compressor between said air compressor and said dryer, said valve movable between a closed position in which said outlet of said air compressor is open to said dryer and an open position in which said outlet of said air compressor is open to said dryer and the atmosphere;

a pressure sensor connected to said air reservoir for detecting the pressure of the dried compressed air stored in said air reservoir; and

a control device connected with said pressure sensor, said valve and said air compressor,

said control device detecting at least one of the accumulated operational time of said air compressor and the number of times said air compressor is operated,

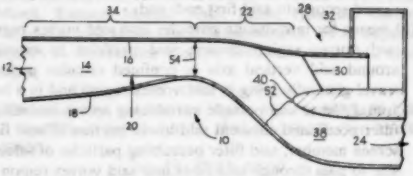
said control device moving said valve to said open position when said at least one of the accumulated operational time of said air compressor and the number of times said air compressor is operated exceeds a predetermined amount thereby causing compressed dried air stored in said air reservoir to be fed back through said dryer to remove moisture from said drying agent and then through said valve to the atmosphere,

said control device moving said valve to said closed position when the pressure of the dried compressed air stored in said air reservoir as sensed by said pressure sensor is reduced to a first pressure that is greater than atmospheric pressure when the compressed dried air is fed back through said dryer.

4,685,942
AXIAL FLOW INLET PARTICLE SEPARATOR

David D. Klassen, Boxford; Roy E. Moyer, Danvers; Frank A. Lastrina, Andover, and Robert P. Tameo, Peabody, all of Mass., assignors to General Electric Company, Lynn, Mass.

Filed Dec. 27, 1982, Ser. No. 453,011
Int. Cl.[4] B01D *45/04*
U.S. Cl. 55—306 9 Claims



1. An inlet particle separator for a gas turbine engine comprising:

an axial flow separator for initially separating engine inlet air into a first flow of relatively contaminated air and a second flow of relatively clean air;

a scavenge system in flow communication with said axial flow separator and effective for receiving said first flow of relatively contaminated air, and including:

a centrifugal separator for separating said first flow of air into a third flow of highly contaminated air at a radially outer portion thereof and a fourth flow of less highly contaminated air at a radially inner portion thereof;

blower means effective for drawing air through said scavenge system and disposed in flow communication with only said radially inner portion of said centrifugal separator for receiving said fourth flow of air; and

bypass means in flow communication with said radially outer portion of said centrifugal separator for channeling said third flow of air around said blower means to be dumped overboard.

4,685,943
FILTRATION APPARATUS

Joseph B. Priestley, Jr., 13200 N. 103rd Ave., #35, Sun City, Ariz. 85351

Division of Ser. No. 794,475, Nov. 4, 1985. This application Jun. 16, 1986, Ser. No. 874,382
Int. Cl.[4] B01D *46/00*
U.S. Cl. 55—400 1 Claim

1. Filtration apparatus including

(a) means for forming in a volume of gas a funnel having an upper portion, a lower portion, a core region, and a vortex region of gas circulating around said core region, said means including

(i) a hollow cylindrical screen filter member having first

and second open inlet and outlet ends and a vertical axis,

(ii) means for rotating said cylindrical screen filter member about said vertical axis to cause gas to circulate around said axis, and,

(iii) a rotating blade positioned in a conduit adjacent said first end for drawing gas through said rotating cylindrical filter screen member in a direction of travel from said second to said first end; and,

(b) means for introducing particles into said vortex region, said vortex region causing said particles to circulate around said vertical axis in confined circular paths of travel generally lying in said vortex region and in a horizontal plane, said particle introducing means including a filter positioned adjacent said lower portion of said filter screen member, said filter permitting particles of selected size to pass through said filter into said vortex region.

4,685,944

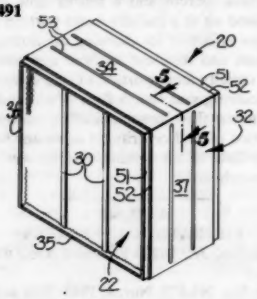
HIGH EFFICIENCY PARTICULATE AIR FILTER

Thomas T. Allan, and Robert V. Cramer, both of Washington, N.C., assignors to Flanders Filters, Inc., Washington, N.C.

Filed Jun. 9, 1982, Ser. No. 386,653

Int. Cl.[4] B01D *46/52*

U.S. Cl. 55—491 **7 Claims**



1. A high efficiency particulate air filter which is characterized by being lightweight and readily disposable after use, and comprising

a sheet of high efficiency particulate air filtering medium folded upon itself in accordion fashion to form a generally rectangular filter pack which includes opposite side edges defined by the edges of the folded sheet and opposite end edges defined by the ends of the sheet,

a relatively thin and lightweight four sided peripheral frame surrounding and supporting said filter pack, with the four sides of said frame being separately molded and overlying and covering respective ones of said opposite side edges and opposite end edges of said pack, said frame being composed of a relatively thin, hard, air impermeable material which is self-bonded and sealed to said filter medium over substantially the entire interface between said medium and said frame to effectively preclude the leakage of air therebetween, and with adjacent edges of adjacent sides of said frame being self-bonded to each other, said frame further having an exterior surface which includes a peripheral shoulder formed in said exterior surface adjacent at least one end of said filter to define a peripheral ledge thereabout, and

at least one separate header surrounding and sealably secured to the external periphery of said frame, with said one header being mounted upon said ledge in abutting relation with the associated shoulder.

4,685,945

METHOD OF PROCESSING HIGH PURITY LOW-OH VITREOUS SILICA FIBERS

Friedemann Freund, 225 Sussex St., San Francisco, Calif. 94131

Continuation-in-part of Ser. No. 577,270, Feb. 6, 1984, abandoned. This application Apr. 21, 1986, Ser. No. 854,121

Int. Cl.[4] C03B *37/01*

U.S. Cl. 65—4.21 **8 Claims**

1. A method of substantially eliminating peroxy linkages from high purity vitreous silica optical waveguide fibers having such linkages disposed therein to produce a waveguide fiber having enhanced stability in its transmission properties in the wavelength region of 1.0 to 1.7 micrometers, said method comprising exposing said vitreous silica optical waveguide fibers to deuterium molecules for a time sufficient to permeate said fibers with deuterium molecules and thereafter exposing said fibers to a high intensity light source having a wavelength of from the short wavelength absorption edge of vitreous silica up to about 650 nanometers and an intensity of at least 10 Lamberts to activate the peroxy linkages therein and react substantially all of said peroxy linkages with deuterium molecules to create deuteroxyl groups within said fibers and to provide a maximum absorption loss at 1.7 micrometers.

4,685,946

METHOD FOR THE MANUFACTURE OF GLASS BODIES

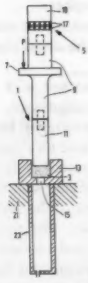
Pierre L. L. M. Derks, Eindhoven, Netherlands; Bernhard Lersmacher, Aachen, and Hans-Jürgen Lydtin, Stolberg, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 25, 1986, Ser. No. 843,900

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511452

Int. Cl.[4] C03B *37/016*

U.S. Cl. 65—17 **6 Claims**



1. A method for the manufacture of a glass body comprising:

(a) applying mechanical force to a gel formed from a thixotropic suspension of SiO_2 particles to reduce the viscosity of said gel,

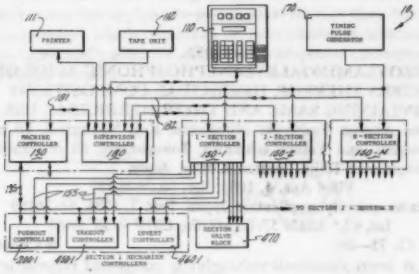
(b) forcing said gel, while in said reduced viscosity state, through a die to form an extruded porous green body; and

(c) purifying and sintering said green body to form a glass body.

4,685,947
GLASSWARE FORMING APPARATUS WITH DISTRIBUTED CONTROL AND METHOD OF OPERATION

Timothy J. Liska, West Simsbury, and Paul F. Scott, Gramby, both of Conn., assignors to Emhart Industries, Inc., Farmington, Conn.

Filed Sep. 12, 1985, Ser. No. 775,454
Int. Cl.[4] C03B 9/40
U.S. Cl. 65—29 10 Claims



1. An improved electronic control system for a glassware forming machine, said forming machine including a plurality of machine sections each section having a plurality of functional components operating in phased relationship within a machine cycle for receiving molten glass and molding glassware articles therewith, said control system including at least one section controller for producing timing signals representing actuating and deactuating times of operational components of at lest one section of said forming machine,

the improvement wherein said timing signals comprise pulse signals, further comprising a timing processor for receiving said pulse signals and for calculating timing data based upon the pulse widths of said timing signals, said timing processor comprising

means for receiving the pulse signal during each machine cycle, outputting a component actuating signal at the leading edge of said pulse signal, and calculating a time delta signal proportional to the pulse width of said pulse,

clock means for tracking elapsed time within an operating cycle of said timing processor, and

means for comparing the time delta signal with the elapsed time and for providing a component deactuating signal at an appropriate point within the timing processor cycle.

7. A method for controlling a glassware forming machine, said forming machine including a plurality of machine sections each section having a plurality of operational components operating in phased relationship within a machine cycle for receiving molten glass and molding glassware articles therewith, and a control system including at least one section controller for producing pulse timing signals representing actuating times of one or more functional components of at least one section of said forming machine and a machine controller for controlling the setup of said forming machine using a plurality of setup parameters, said control method comprising the steps, repeated at each machine cycle, of:

receiving at least one of said pulse timing signals from said section controller;

generating a first component actuating signal at the leading edge of said pulse timing signal;

measuring the width of said pulse timing signal and producing and storing a time delta value based upon such pulse width;

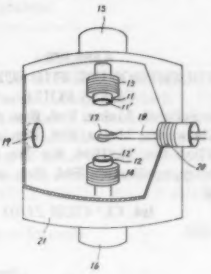
generating a second component actuating signal delayed from said first component actuating signal by a time delta value produced during a previous machine cycle; and

outputting said first and second component actuating signals to one of said functional components.

4,685,948
MOLD FOR PRESS-MOLDING GLASS OPTICAL ELEMENTS AND A MOLDING METHOD USING THE SAME

Kiyoshi Kuribayashi, Hirakata; Masayuki Sakai, Osaka; Hideto Monji, Katano; Masaki Aoki, Mino; Hideyuki Okinaka, Toyonaka, and Hideo Torii, Higashiosaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 31, 1986, Ser. No. 824,961
Claims priority, application Japan, Feb. 8, 1985, 60-23837; Apr. 19, 1985, 60-84902; Jul. 15, 1985, 60-155405; Oct. 22, 1985, 60-236061
Int. Cl.[4] C03B 40/00
U.S. Cl. 65—26 15 Claims



1. A method for press-molding a glass optical element comprising the steps of:

heating a mass of glass to be softened;

pressing the softened mass of glass with a pair of heated molds; and

cooling said pair of molds thereby to obtain a molded glass optical element,

wherein each of said pair of molds comprises: a base material having high heat resistance, high workability and high adhesiveness to a press surface film; and said press surface film formed on said base material, said base material being a super hard alloy mainly composed of tungsten carbide (WC) or a cermet mainly composed of titanium carbide (TiC) or a cermet mainly composed of titanium nitride (TiN) or a cermet mainly composed of chromium carbide (Cr_3C_2) or a cermet mainly composed of alumina (Al_2O_3) or silicon (Si), said press surface film being: an iridium (Ir) film; or a ruthenium (Ru) fil:m; or an alloy film comprising iridium (Ir) and one member selected from the group consisting of platinum (Pt) in an amount of 29 wt. % or less, rhenium (Re), osmium (Os), rhodium (Rh) and ruthenium (Ru); or an alloy film; comprising ruthenium (Ru) and one member selected from the group consisting of platinum (Pt) in an amount of 29 wt. % or less, rhenium (Re), osmium (Os) and rhodium (Rh).

4,685,949
GLASS FLOWER PROCESS

Donald E. Hacker, 3200 NW. 5th Ter., Pompano Beach, Fla. 33064

Filed Dec. 19, 1986, Ser. No. 943,327
Int. Cl.[4] C03B 23/09
U.S. Cl. 65—42 1 Claim

1. In a process for preparing glass flowers having petals, the steps of preparing a petal comprising: providing a blown elongated enlarged hollow bulb on a hollow glass tube, heating and manipulating the bulb so as to separate it into two elongated

dish-like pre-petal members, removing a said pre-petal member from the tube, elongating the end of said pre-petal member so

as to form a solid tip, attaching said member to a glass flower stem at said tip and heating and manipulating said member so as to refine the shape of the petal.

4,685,950

PROCESS FOR IMPROVING THE SURFACE FINISH OF GLASS FOILS

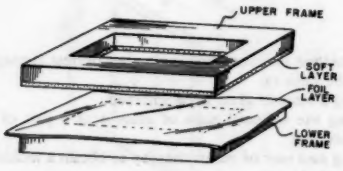
Hans-Wilhelm Schulze, Mainz, Fed. Rep. of Germany, assignor to Schott Glaswerke, Mainz, Fed. Rep. of Germany

Filed Jan. 15, 1986, Ser. No. 819,239

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1985, 3501398

Int. Cl.[4] C03B *23/02*

U.S. Cl. 65—106 **19 Claims**



1. A process for improving the surface of a glass foil comprising; placing the foil on a first frame such that the foil is permitted to expand; heating the foil together with the frame at a temperature which lies in the temperature range at which the foil begins to soften without sagging; placing a second frame, which is exactly as large and exactly at the same temperature as the first frame, on the foil to clamp the foil within the first and second frame; then clamping the foil in both frames such that the foil will contract differentially with respect to the frames upon cooling, and then cooling.

4,685,951

TOBACCO AXILLARY BUD REGULATING COMPOSITION

Kouichi Nishimuta, Saitama; Kazuo Izumi, and Kazue Shinsugi, both of Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

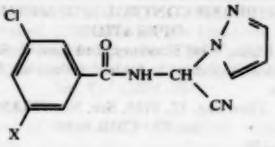
Filed Dec. 26, 1985, Ser. No. 813,524

Claims priority, application Japan, Jan. 4, 1985, 60-278

Int. Cl.[4] A01N *43/56*

U.S. Cl. 71—78 **6 Claims**

1. A method for regulating tobacco axillary bud which comprises applying to tobacco plants a tobacco axillary bud regulatory effective amount of a chlorobenzoylamino derivative of the following formula,



wherein X means a hydrogen or chlorine atom.

4,685,952

BENZOYLAMINOALKYLENEPHOSPHONIC ACIDS OR ESTERS THEREOF, HERBICIDAL COMPOSITIONS CONTAINING SAME AND THEIR HERBICIDAL USE

Shizuo Azuma; Toshiyuki Hiramatsu; Koji Nakagawa, all of Iwakuni, and Yataro Ichikawa, Tokorozawa, all of Japan, assignors to Teijin Limited, Osaka, Japan

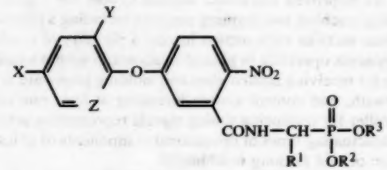
Filed Apr. 4, 1986, Ser. No. 848,117

Claims priority, application Japan, Feb. 7, 1986, 61-24150

Int. Cl.[4] A01N *57/06, 43/06;* C07F *9/58, 9/40*

U.S. Cl. 71—86 **8 Claims**

1. A benzoylaminoalkylphosphonic compound represented by the formula



wherein X and Y are identical or different and each represents a hydrogen atom, a halogen atom, CF_3, or an alkyl group having not more than 5 carbon atoms, Z is CH or N, and R^1, R^2 and R^3 are identical or different and each represents a hydrogen atom or a lower alkyl group having 1 to 5 carbon atoms.

7. A method of eradicating weeds, which comprises applying a benzoylaminoalkylphosphonic compound of claim **1** to a locus where broad-leaved weeds are growing or are likely to grow in an amount effective for eradicating the weeds.

4,685,953

DIPHENOXYMETHYL-PYRIDINEPHOSPHATES AND PHOSPHOROTHIOATES HAVING HERBICIDAL PROPERTIES

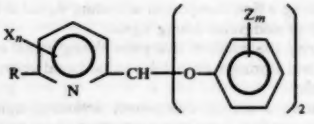
Sudarshan K. Malhotra, Walnut Creek, and Ingrid L. Evoy, Antioch, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 656,834, Oct. 2, 1984, Pat. No. 4,606,757, which is a continuation of Ser. No. 452,584, Dec. 23, 1982, abandoned. This application Dec. 30, 1985, Ser. No. 814,840

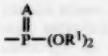
Int. Cl.[4] C07F *9/58;* A01N *43/40*

U.S. Cl. 71—86 **12 Claims**

1. A compound corresponding to the formula

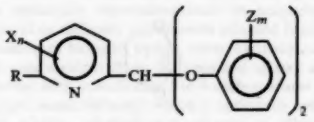


wherein R represents the radical

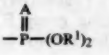


wherein A is oxygen or sulfur and R^1 is alkyl of 1 to 4 carbon atoms X represents bromo, chloro or fluoro; n represents an integer of 0 or 1; Z represents bromo, chloro, fluoro, alkylthio of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms and m represents an integer of 0 or 1.

9. A method for controlling the growth of undesirable plants which comprises applying to plants, plant parts or their habitat a composition which comprises an inert carrier in admixture with herbicidally effective amount of a compound corresponding to the formula



wherein R represents the radical



wherein A is oxygen or sulfur and R^1 is alkyl of 1 to 4 carbon atoms X represents bromo, chloro or fluoro; n represents an integer of 0 or 1; Z represents bromo, chloro, fluoro, alkylthio of 1 to 4 carbon atoms or alkoxy of 1 to 4 carbon atoms and m represents an integer of 0 or 1.

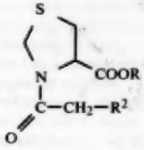
4,685,954

3-ACYL SUBSTITUTED OF 2- OR 4-THIAZOLIDINE-CARBOXYLIC ACID HAVING A PHYTO GROWTH REGULATING AND BIOSTIMULATING ACTION

Ottorino Palla, Crema; Franco Gozzo, S.Donato Milanese, and Marco Radice, Corsico, all of Italy, assignors to Montedison S.p.A, Milan, Italy

Continuation of Ser. No. 713,690, Mar. 19, 1985, abandoned, which is a continuation of Ser. No. 477,441, Mar. 21, 1983, abandoned. This application Jul. 16, 1986, Ser. No. 886,237
Claims priority, application Italy, Mar. 22, 1982, 20306 A/82
Int. Cl.[4] C07D *277/06;* A01N *43/78*
U.S. Cl. 71—90 **2 Claims**

1. A compound of formula:



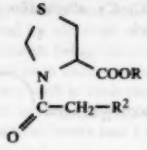
(I)

in which:

R is a hydrogen atom or a C_1–C_4 alkyl; and

R^2 is a 1-naphthyl or 3-indolyl radical, said compound being characterized in that it is useful in agriculture and floriculture as both a phyto-growth regulator and a biostimulant.

2. The method of regulating the phyto-growth and biostimulating growing agricultural and floricultural plants which consists in treating such plants with an effective amount of at least one compound of formula:



(I)

in which:

R is a hydrogen atom or a C_1–C_4 alkyl; and

R^2 is selected from the group consisting of naphthyl, indolyl and phenoxy groups, said groups being substituted by 1 to 3 substituents selected from the group consisting of halogen atoms, C_1–C_4 alkyl, C_1–C_4 alkoxy, the phenoxy groups, and the pyridyloxy group, the two latter groups substituted by substituents selected from the group consisting of 1 to 3 halogen atoms, C_1–C_4 alkyl groups, and C_1–C_4 haloalkyl groups.

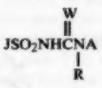
4,685,955

HERBICIDAL SULFONAMIDES

Joel R. Christensen; Paul H. Liang, and Mark E. Thompson, all of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 740,894, Jun. 3, 1985, abandoned. This application Mar. 27, 1986, Ser. No. 842,792
Int. Cl.[4] C07D *407/12, 409/12, 403/12;* A01N *47/36*
U.S. Cl. 71—92 **58 Claims**

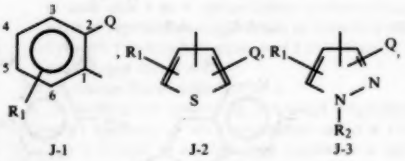
1. A compound of the formula



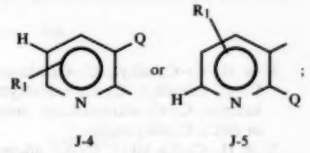
I

wherein

J is



J-1 J-2 J-3



J-4 J-5

R is H or CH_3;

W is O or S;

R_1 is H, C_1–C_3 alkyl, C_1–C_3 haloalkyl, halogen, nitro, C_1–C_3 alkoxy, $SO_2NR_aR_b$, C_1–C_3 alkylthio, C_1–C_3 alkylsulfinyl, C_1–C_3 alkylsulfonyl, CO_2R_c, amino, C_1–C_3 alkylamino, di(C_1–C_3)alkylamino, CH_2OCH_3, CH_2SCH_3 or CH_2CN;

R_a is H, C_1–C_4 alkyl, C_2–C_3 cyanoalkyl, OCH_3 or OC_2H_5;

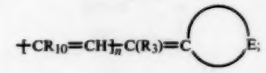
R_b is H, C_1–C_4 alkyl or C_3–C_4 alkenyl; or

R_a and R_b may be taken together as $(CH_2)_3$, $(CH_2)_4$, $(CH_2)_5$ or $—CH_2CH_2OCH_2CH_2—$;

R_c is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_2–C_4 haloalkyl, C_2–C_3 cyanoalkyl, C_5–C_6 cycloalkyl, C_4–C_7 cycloalkylalkyl or C_2–C_4 alkoxyalkyl;

R_2 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, phenyl, phenyl substituted with Cl, NO_2, CH_3 or OCH_3, C_1–C_3 alkoxycarbonyl, C_1–C_3 alkylsulfonyl or di(C_1–C_2)alkylamino sulfamoyl;

Q is



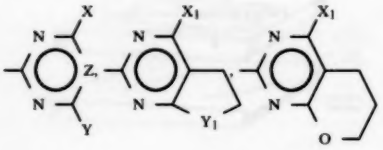
n is 0, 1 or 2;

R_3 is H, C_1–C_4 alkyl, Cl or Br;

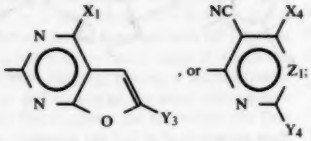
R_{10} is H or C_1–C_4 alkyl;

E is a bridge of 4 or 5 atoms, which may be substituted or unsubstituted, containing 0–2 heteroatoms selected from the group consisting of oxygen, sulfur and nitrogen, and also containing 2–5 carbon atoms, said bridge together with one carbon attachment site forming a partially saturated or a fully unsaturated, nonaromatic 5- or 6-membered carbocyclic or heterocyclic ring, with the proviso that when E contains two atoms of oxygen or sulfur, they must be separated by at least one atom of carbon, and that oxygen and sulfur are only linked to each other if the sulfur is in the form SO or SO_2; in the bridging group E, sulfur may take the form of S, SO or SO_2 and one or two of the carbon atoms may be a carbonyl, thiocarbonyl or the cyclic 5- and 6-membered ketals thereof; when one of the bridging atoms is a substituted carbon, the substituents on said carbon include H, C_1–C_4 alkyl, C_1–C_4 alkoxy, halogen or C_1–C_4 haloalkoxy; when the bridging atom is a nitrogen, the substituent on said nitrogen is H, C_1–C_4 alkyl, C_1–C_4 haloalkyl, C_1–C_4 alkoxyalkyl, C_2–C_4 cyanoalkyl, C_3–C_4 alkenyl or C_3–C_4 alkynyl;

A is



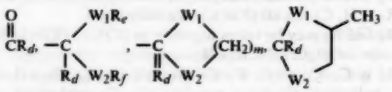
A-1 A-2 A-3



A-4 A-7

X is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, halogen, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino or di(C_1–C_3)alkylamino;

Y is H, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkoxy, C_1–C_4 haloalkylthio, C_1–C_4 alkylthio, C_2–C_5 alkoxyalkyl, C_2–C_5 alkoxyalkoxy, amino, C_1–C_3 alkylamino, Di(C_1–C_3)alkylamino, C_3–C_4 alkenyloxy, C_3–C_4 alkynyloxy, C_2–C_5 alkylsulfinylalkyl, C_1–C_4 haloalkyl, C_2–C_5 alkylsulfonylalkyl, C_3–C_5 cycloalkyl, C_2–C_4 alkynyl, C_2–C_5 alkylthioalkyl,



W_1 and W_2 are independently O or S;

m is 2 or 3;

R_d is H or CH_3;

R_e is C_1–C_2 alkyl;

R_f is C_1–C_2 alkyl;

Z is CH, CCH_3, CC_2H_5, CCl or CBr;

Z_1 is N;

Y_1 is O or CH_2;

X_1 is CH_3, OCH_3, OC_2H_5 or OCF_2H;

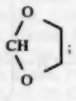
Y_3 is H or CH_3;

X_4 is CH_3, OCH_3, OC_2H_5, CH_2OCH_3 or Cl; and

Y_4 is CH_3, OCH_3, OC_2H_5 or Cl;

and their agriculturally suitable salts; provided that

(a) when W is S, then R is H, A is A-1, Z is CH and Y is CH_3, OCH_3, OC_2H_5, CH_2OCH_3, C_2H_5, CF_3, SCH_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $OCH_2CH_2OCH_3$, $CH(OCH_3)_2$ or



(b) when X is Cl, Br, F or I, then Z is CH and Y is OCH_3, OC_2H_5, NH_2, $NHCH_3$, $N(CH_3)_2$, OCF_2H or $N(OCH_3)CH_3$;

(c) when X or Y is C_1 haloalkoxy, then Z is CH;

(d) when the bridging group E contains a thiocarbonyl substituent, said thiocarbonyl carbon must be bonded to a nitrogen atom;

(e) when J is J-2 or J-3, the substituent Q and the sulfonylurea bridge are on adjacent carbon atoms;

(f) when the total number of carbon atoms in X and Y is greater than 4, then the total number of carbon atoms in R_1, R_2 and Q is less than or equal to 10; and

(g) X_4 and Y_4 are not simultaneously Cl.

4,685,956

1-ARYL-5-HYDRAZINO-PYRAZOLES, COMPOSITIONS CONTAINING THEM, AND HERBICIDAL METHOD OF USING THEM

Reinhold Gehring, Wuppertal; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Hans-Joachim Santel, Leverkusen, and Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

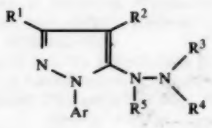
Filed Jul. 14, 1986, Ser. No. 885,051

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1985, 3528478

Int. Cl.[4] A01N *43/56*; **C07D** *231/38, 401/04*

U.S. Cl. 71—92 **7 Claims**

1. A 1-aryl-5-hydrazino-pyrazole of the formula



in which

R^1 represents hydrogen, or represents straight-chain or branched alkyl with 1 to 4 carbon atoms,

R^2 represents cyano or nitro,

R^3 represents hydrogen, or represents an alkyl, alkenyl or alkinyl with in each case up to 8 carbon atoms and in each case optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of halogen, cyano, nitro, hydroxyl, carboxyl, in each case straight-chain or branched alkoxy and alkoxycarbonyl with in each case 1 to 6 carbon atoms in the alkyl

part and aminocarbonyl which is optionally substituted by alkyl, alkoxy, alkylsulphonyl, alkenyl or alkinyl with in each case up to 4 carbon atoms, pyrrolidin-1-ylcarbonyl, piperidin-1-ylcarbonyl, morpholin-1-ylcarbonyl, or perhydroazepin-1-yl carbonyl; or furthermore represents cycloalkyl which has 3 to 7 carbon atoms and is optionally monosubstituted or polysubstituted by identical or different substituents from the group consisting of halogen, and/or straight-chain or branched alkyl with 1 to 4 carbon atoms, or represents a radical

or represents a radical SO_2-R^7,

R^4 represents hydrogen, or represents alkyl, alkenyl or alkinyl with in each case up to 8 carbon atoms and in each case optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of halogen, cyano, nitro, hydroxyl, carboxyl, in each case straight-chain or branched alkoxy and alkoxycarbonyl with in each case 1 to 6 carbon atoms in the alkyl part and aminocarbonyl which is optionally substituted by alkyl, alkoxy, alkylsulfonyl, alkenyl or alkinyl with in each case up to 4 carbon atoms, pyrrolidin-1-ylcarbonyl, piperidin-1-ylcarbonyl, morpholin-1-ylcarbonyl, or perhydroazepin-1-ylcarbonyl; or furthermore represents cycloalkyl which has 3 to 7 carbon atoms and is optionally monosubstituted or polysubstituted by identical or different substituents from the group consisting of halogen and straight-chain or branched alkyl with 1 to 4 carbon atoms, or represents a radical

or represents a radical SO_2-R^7,

R^5 represents hydrogen; or, in the case where R^4 represents hydrogen, R^5 may also represent a radical

or a radical -SO_2-R^7, or may represent alkyl, alkenyl or alkinyl with in each case up to 8 carbon atoms and in each case optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of halogen, cyano, nitro, hydroxyl, carboxyl, in each case straight-chain or branched alkoxy and alkoxycarbonyl with in each case up to 6 carbon atoms in the alky part and amino-carbonyl which is optionally substituted by alkyl, alkoxy, alkylsulphonyl, alkenyl or alkinyl with in each case up to 4 carbon atoms, pyrrolidin-1-ylcarbonyl, piperidin-1-ylcarbonyl, morpholin-1-carbonyl, or perhydroazepin-1-ylcarbonyl; or furthermore represents cycloalkyl which 3 to 7 carbon atoms and is optionally monosubstituted or polysubstituted by identical or different substituents from the group consisting of halogen and/or straight-chain or branched alkyl with 1 to 4 carbon atoms, wherein, in each case,

x represents oxygen or sulphur,

R^6 represents hydrogen, or represents in each case straight-chain or branched alkyl, alkoxy, alkoxyalkyl, alkylthio, alkylthioalkyl, alkylamino or dialkylamino with in each case 1 to 4 carbon atoms in the individual alkyl parts, or represents straight-chain or branched halogenoalkyl with 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, or represents in each case straight-chain or branched alkenyl or alkinyl with 2 to 4 carbon atoms, or represents cycloalkyl which has 3 to 7 carbon atoms and is optionally monosubstituted or polysubstituted by identical or different substituents from the group consisting of halogen and in each case straight-chain or branched alkyl with 1 to 4 carbon atoms and halogenoalkyl with 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, or represents phenyl, phenoxy, phenylthio or phenylamino, in each case optionally monosubstituted or polysubstituted by identical or different substituents, the phenyl substituents being selected from the group consisting of halogen or in each case straight-chain or branched alkyl or alkoxy, with in each case 1 to 4 carbon atoms, or straight-chain or branched halogenoalkyl with in each case 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms and

R^7 represents in each case straight-chain or branched alkyl, hydroxyalkyl or alkoxyalkyl with in each case 1 to 4 carbon atoms in the individual alkyl parts, or represents straight-chain or branched halogenoalkyl with 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, or represents in each case straight-chain or branched alkenyl or alkinyl with in each case 2 to 4 carbon atoms, or represents cycloalkyl with 3 to 7 carbon atoms, or represents benzyl or phenyl, in each case optionally monosubstiuted or polysubstituted by identical or different substituents by identical or different substituents from the group consisting of halogen, cyano, nitro and in each case straight-chain or branched alkyl, alkoxy and alkylthio with in each case 1 to 4 carbon alkoxy and alkylthio and straight-chain of branched halogenoalkyl with 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms and Ar represents phenyl which is monosubstituted or polysubstituted by identical or different substituents, or represents 2-pyridyl, 3-pyridyl or 4-pyridyl, in each case optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of cyano, nitro, halogen, in each case straight-chain or branched alkyl, alkoxy or alkoxy-carbonyl with in each case 1 to 4 carbon atoms in the alkyl part, in each case straight-chain or branched halogenoalkyl or halogenoalkoxy with in each case 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms and a radical -$S(O)_m$-R^9,

wherein

R^9 represents amino, or represents in each case straight-chain or branched alkyl, alkylamino or dialkylamino with in each case 1 to 4 carbon atoms in the individual alkyl parts or represents straight chain or branched halogenoalkyl with 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms and

m represents the number 0, 1 or 2.

6. A method of combating unwanted vegetation which comprises applying to such vegetation or to a locus from which it is desired to exclude such vegetation a herbicidally effective amount of a 1-aryl-5-hydrazinopyrazole according to claim **1**.

4,685,957

1-ARYL-5-IMINOAMINOPYRAZOLES, COMPOSITIONS CONTAINING THEM, AND HERBICIDAL METHOD OF USING THEM

Reinhold Gehring, Wuppertal; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Klaus Lürssen, Bergisch-Gladbach; Hans-Joachim Santel, Leverkusen, and Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

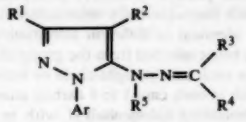
Filed Jul. 14, 1986, Ser. No. 885,064

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1985, 3528477

Int. Cl.[4] **A01N** *43/56;* **C07D** *231/38, 401/04*

U.S. Cl. 71—92 **8 Claims**

1. A 1-aryl-pyrazole of the formula



in which

R^1 represents hydrogen, or represents straight-chain or branched alkyl with 1 to 4 carbon atoms,

R^2 represents cyano or nitro,

R^3 and R^4 independently of one another each represent hydrogen, or represent in each case straight-chain or branched alkyl, alkoxyalkyl, alkylthioalkyl or halogenoalkyl with in each case 1 to 4 carbon atoms in the individual alkyl parts and, in the case of halogenoalkyl, with 1 to 9 identical or different halogen atoms, or represent phenyl which is optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of halogen, cyano, nitro and in each case straight-chain or branched alkyl, alkoxy, alkylthio and halogenoalkyl with in each case 1 to 4 carbon atoms and, in the case of the halogenoalkyl, with 1 to 9 identical or different halogen atoms,

or

R^3 and R^4 together represent a straight-chain or branched divalent alkylene radical with 3 to 12 carbon atoms,

R^5 represents hydrogen, or represents straight-chain or branched alkyl with 1 to 4 carbon atoms and

Ar represents phenyl, 2-pyridyl, 3-pyridyl or 4-pyridyl, in each case optionally monosubstituted or polysubstituted by identical or different substituents selected from the group consisting of cyano, nitro, halogen, in each case straight-chain or branched alkyl, alkoxy and alkoxycarbonyl with in each case 1 to 4 carbon atoms in the alkyl part, and in addition in each case straight-chain or branched halogenoalkyl and halogenoalkoxy with in each case 1 to 4 carbon atoms and 1 to 9 identical or different halogen atoms, and a radical $-S(O)_m-R^6$

wherein

R^6 represents amino, or represents in each case straight-chain or branched alkyl, alkylamino, dialkylamino or halogenoalkyl, with in each case 1 to 4 carbon atoms in the individual alkyl parts and, in the case of halogenoalkyl, with 1 to 9 identical or different halogen atoms and m represents the number 0, 1 or 2.

6. A method of regulating the growth of plants which comprises applying to such plants or to a locus in which said plants are grown or to be grown, a plant growth regulating effective amount of a compound according to claim **1**.

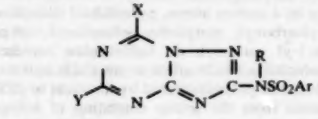
4,685,958

SULFONAMIDES DERIVED FROM SUBSTITUTED 2-AMINO-1,2,4-TRIAZOLO[1,5-A]-1,3,5-TRIAZINES AND COMPOSITIONS AND METHODS OF CONTROLLING UNDESIRED VEGETATION

Norman R. Pearson, Walnut Creek, and William A. Kleschick, Martinez, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

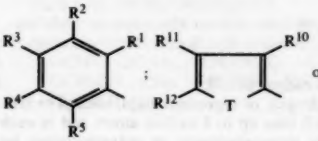
Filed May 6, 1986, Ser. No. 860,160
Int. Cl.[4] C07D *487/04;* **A01N** *43/90*
U.S. Cl. 71—93 **11 Claims**

7. Method of controlling undesired vegetation which comprises the application of a herbicidally effective amount of a compound having the formula:



(I)

wherein Ar represents



or

wherein R represents hydrogen, alkyl, alkenyl, alkynyl, phenylalkyl, substituted phenylalkyl, acyl, alkoxycarbonyl, phenoxycarbonyl, dialkylaminocarbonyl, alkysulfonyl, phenylsulfonyl, alkylthiocarbonyl or phenylthiocarbonyl, each containing no more than 10 carbon atoms; R^1 represents halo, $-NO_2$, phenyl, $-CF_3$, $-OCF_3$, $-OCF_2CF_2H$, $-OCF_2CCl_2H$, $-OCH_2CF_3$, $-SCF_3$, $-SCF_2CF_2H$, $-SCF_2CCl_2H$, $-SOCF_3$, $-SOCF_2CF_2H$, $-SOCF_2CCl_2H$, $-SO_2CF_3$, $-SO_2CF_2CF_2H$, $-SO_2CF_2CCL_2H$, $-SR^6$, $-SOR^6$, $-SO_2R^6$, $-CN$, $-COOR^7$, $-CONR^8(R^9)$, $-SO_2NR^8R^9$, $-SO_3R^8$ and $-SO_3CH_2CF_3$; R^2 and R^4 represent H, halo, C_1–C_4 alkyl and $-OR^8$; R^3 is H; and R^5 represents H, C_1–C_4 alkyl, C_1–C_4 alkoxy, halo, NO_2, CF_3, $-OCF_3$, $-OCF_2CF_2H$, $-OCF_2CCl_2H$, $-OCH_2CF_3$, $-SCF_3$, $-SCF_2CF_2H$, SCF_2CCl_2H, $-SOCF_3$, $-SOCF_2CF_2H$, $-SOCF_2CCl_2H$, $-SO_2CFhd$ **3**, $-SO_2CF_2CF_2H$, $-SO_2CF_2CCl_2H$, $-SR^6$, $-SOR^6$, $-SO_2R^6$, $-CN$, $-COOR^7$, $-CN$, $-COOR^7$, $-CONR^8(R^9)$, $-SO_3R^8$, and $-SO_3CH_2CF_3$ wherein R_6 represents phenyl or C_1–C_4 alkyl, R^7 represents C_1–C_6 alkyl, alkenyl or alkynyl and R^8 and R^9 individually represent C_1–C_4 alkyl; and X and Y independently represent H, halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkoxy, or C_1–C_4alkylthio groups; T represents O or S; R^{10}, R^{11} and R^{12} independently represent hydrogen, C_1–C_4 alkyl or halo; and R^{13}, R^{14} and R^{15} independently represent hydrogen, C_1–C_4 alkyl, halo or $COOR^{16}$ wherein R^{16} represents C_1–C_4 alkyl, alkenyl or alkynyl.

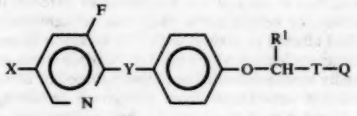
4,685,959

PYRIDYLOXYPHENOXYALKANOATES, ALKENOATES AND DERIVATIVES THEREOF, USEFUL AS HERBICIDAL AGENTS

Richard B. Rogers, and Cleve A. I. Goring, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 17, 1985, Ser. No. 809,829
Int. Cl.[4] A01N *43/40;* **C07D** *211/72, 211/76*
U.S. Cl. 71—94 **87 Claims**

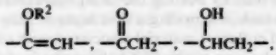
1. A compound of the formula

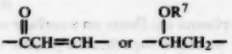


(A)

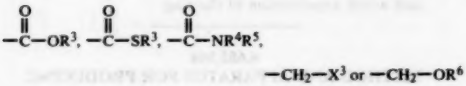
wherein

X represents —Cl, —Br, —F, —I;
Y represents oxygen or sulfur;
T represents

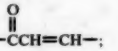




R^1 is hydrogen or loweralkyl;
R^2 is loweralkyl;
R^7 is loweralkyl, acyl or sulfonyl;
Q is



in which
R^3 is hydrogen, loweralkyl, lowerhaloalkyl, lowercyanoalkyl, loweralkenyl, lowerhaloalkenyl, loweralkynyl, loweralkoxyalkyl, lowerdialkylaminoalkyl, loweralkylthioalkyl, loweralkylsulfinylalkyl, loweralkylsulfonylalkyl, tetrahydrofuranylmethyl, tetrahydropyranylmethyl, benzyl, halobenzyl, loweralkylbenzyl, loweralkoxybenzyl, phenyl, halophenyl, loweralkoxyphenyl, loweralkylphenyl, cycloalkyl, cycloalkalkyl, N-alkylideneamino, sodium, potassium, magnesium or calcium; and Q is H when T is



each of R^4 and R^5 independently selected from hydrogen, loweralkyl, lowerhydroxyalkyl, loweralkoxyalkyl, loweralkylsulfonyl, loweralkenyl, loweralkynyl, lowerhaloalkenyl, cycloalkyl, phenyl, halophenyl, loweralkoxyphenyl, loweralkylphenyl, cyano, amino, lower dialkylamino, lower monoalkylamino or loweralkoxy;
X^3 is bromo, chloro, fluoro or iodo; and
R^6 is hydrogen or acyl wherein in the above, acyl represents a C_1–C_6 aliphatic acyl, or C_1–C_6 alkoxycarbonyl; anylacyl represents benzoyl; and cycloalkyl consists of C_3–C_6 carbon atoms.

59. A method for the control of weeds comprising an application of a herbicidally-effective amount of a compound of claim 1 to the locus of said weeds.

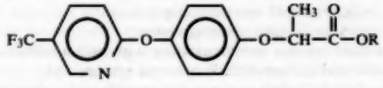
4,685,960

METHOD OF INCREASING THE YIELD OF SUGAR FROM SUGARCANE

Louis G. Nickell, Chicago; Leonard J. Stach, Riverside, and Takeo Hokama, Chicago, all of Ill., assignors to Sandoz Ltd., Basel, Switzerland

Filed Aug. 19, 1985, Ser. No. 767,226
Int. Cl.[4] A01N *43/40*
U.S. Cl. 71—94 **13 Claims**

1. A method for increasing the recoverable sugar contained in sugarcane which comprises contacting the sugarcane plant with an ester having the structural formula:



wherein R is an alkyl group having from 10 to 16 carbon atoms, in an amount effective in increasing the amount of recoverable sugar contained in said sugarcane.

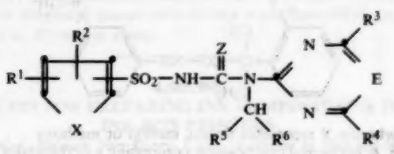
4,685,961

HERBICIDAL SULFONYLUREAS

Werner Töpfl, Dornach; Willy Meyer, Riehen, both of Switzerland, and Hans-Dieter Schneider, Weil am Rhein, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 7, 1985, Ser. No. 699,388
Claims priority, application Switzerland, Feb. 14, 1984, 720/84; Apr. 12, 1984, 1841/84
Int. Cl.[4] C07D *239/69, 403/12;* A01N *43/54, 43/707*
U.S. Cl. 71—92 **26 Claims**

1. An N-sulfonyl-N'-pyrimidinylurea of the formula



wherein
E is —CH=,
X is —CH=CH—,
Z is oxygen or sulfur,
R^1 is halogen, nitro, C_1–C_4alkoxy, C_1–C_4haloalkoxy, C_2–C_4alkenyloxy, C_2–C_4haloalkenyloxy, $NR^{10}R^{11}$, $—OSO_2R^8$, $—COR^8$ or $—SO_2NR^{10}R^{11}$,
R^2 is hydrogen, halogen or C_1–C_4alkyl,
R^3 and R^4, each independently of the other, are halogen, C_1–C_4alkyl, C_1–C_4alkoxy, C_1–C_4haloalkyl, C_1–C_4haloalkoxy, C_2–C_4alkoxyalkyl, C_2–C_4alkoxyalkoxy, cyclopropyl, NH_2, C_1–C_4alkylamino or di(C_1–C_4)alkylamino,
R^5 is hydrogen, or phenyl or furyl, which is unsubstituted or substituted by halogen, or C_1–C_4alkyl,
R^6 is an $—S(O)_mR^9$ radical or a heterocyclic group selected from among 1,2,4-triazinyl, imidazolyl, indolyl, benzimidazolyl or benzotrizolyl, which is bound via the nitrogen atom, wherein the benzene ring is unsubstituted or substituted by one or more identical or different members selected from the group consisting of nitro, halogen or C_1–C_4alkyl,
R^8 is C_1–C_4alkoxy, C_1–C_4alkyl, C_1–C_4haloalkyl, C_4–C_7cycloalkyl, C_2–C_4alkoxyalkyl, C_2–C_4alkenyl, C_2–C_4haloalkenyl, C_5–C_6cycloalkenyl, C_3–C_4alkynyl, C_1–C_4cyanoalkyl, C_1–C_4alkyl-NR^9R^{10}, benzyl or benzyl which is substituted by halogen,
R^9 is C_1–C_4alkyl which is unsubstituted or substituted by halogen, C_2–C_4alkoxy, carboxyl, C_1–C_4alkoxycarbonyl or $—CONR^{10}R^{11}$, or is phenyl, benzyl or naphthyl, each of which is unsubstituted or substituted by one or more identical or different members selected from the group consisting of halogen, nitro, carboxyl, C_1–C_4alkyl, C_1–C_4haloalkyl, C_1–C_4alkoxy or C_1–C_4haloalkoxy, and in an $—SR^9$ radical, R^9 can also be a radical selected from $—CZ—C_1$–C_4alkyl, $—CZO—C_1$–C_4alkyl, $—CZNR^{10}R^{11}$, —CZ—phenyl, CZ—benzyl or CZ—naphthyl, wherein the phenyl rings are unsubstituted or substituted as indicated above,
R^{10} and R^{11} each independently of the other are hydrogen, C_1–C_4alkyl, C_3–C_4alkenyl, C_3–C_4alkynyl, C_1–C_4cyanoalkyl or one of R^{10} and R^{11} is C_1–C_4alkoxy or C_2–C_4alkoxyalkyl, phenyl or benzyl, wherein the phenyl ring is unsubstituted or substituted by halogen, nitro, C_1–C_4alkoxy or C_1–C_4haloalkyl or
R^{10} and R^{11} together with the nitrogen atom to which they are attached form the pyrrolidino or piperidino ring.

21. A method of controlling undesired plant growth, which

comprises application of a herbicidally effective amount of a compound of claim 1, or of a composition containing such a compound to the undesired plants or to the locus thereof.

4,685,962

PHENYLACETANILIDE DERIVATIVES

Tetsuo Takematsu, Utsunomiya; Akinori Suzuki, Chiba; Kazuya Toda, and Masuo Goto, both of Nagano, all of Japan, assignors to Yashima Chemical Industrial Co., Ltd., Tokyo, Japan

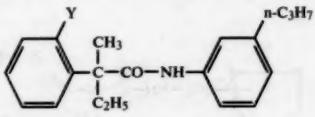
Filed Dec. 17, 1984, Ser. No. 682,762

Claims priority, application Japan, Dec. 26, 1983, 58-244071

Int. Cl.[4] A01N *37/22;* **C07C** *103/85, 103/78, 103/76*

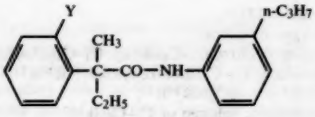
U.S. Cl. 71—118 **8 Claims**

1. A compound of the formula



wherein Y represents fluoro, methyl or methoxy.

5. A herbicidal composition comprising a herbicidally effective amount of a compound of the formula:



wherein Y represents fluoro, methyl or methoxy and an inert liquid or solid carrier or diluent.

4,685,963

PROCESS FOR THE EXTRACTION OF PLATINUM GROUP METALS

James Saville, Anniston, Ala., assignor to Texasgulf Minerals and Metals, Inc., Anniston, Ala.

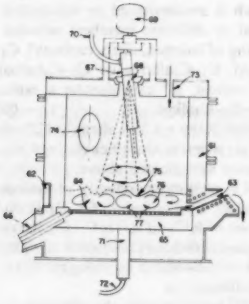
Continuation-in-part of Ser. No. 259,883, May 4, 1981, abandoned, which is a continuation of Ser. No. 158,184, Jun. 10, 1980, Pat. No. 4,295,881, which is a continuation of Ser. No. 38,820, May 14, 1979, abandoned, which is a continuation-in-part of Ser. No. 32,680, Apr. 23, 1979, abandoned. This application Jun. 18, 1984, Ser. No. 621,572

Claims priority, application South Africa, May 22, 1978, 78/2907

The portion of the term of this patent subsequent to Oct. 20, 1998, has been disclaimed.

Int. Cl.[4] C22B *11/00*

U.S. Cl. 75—10.19 **4 Claims**



1. A process for recovering platinum group metals from feedstock materials including such metals, in a plasma arc furnace which comprises the steps of:

introducing a charge of flux, a collector material, and a feedstock material to the plasma furnace;

forming a melt by heating the charge to at least about 1350° C., the melt comprising a first layer of slag and a second layer of collector material associated with a major portion of the platinum group metals from the feedstock material; and

impinging a plasma arc flame on a surface on a surface of the slag layer so that a superheated puddle is formed on said surface having a temperature of about 100° to 500° C. greater than the melt, and which fluid and thermal flow in the superheated puddle and slag whereby the accumulation of platinum group metals in the second layer is accelerated and the plasma arc flame is moved across the slag layer surface to distribute heat in the superheated puddle and avoid vaporization of the slag.

4,685,964

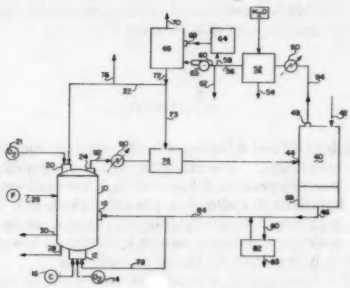
METHOD AND APPARATUS FOR PRODUCING MOLTEN IRON USING COAL

Frank V. Summers, Charlotte, N.C.; John C. Scarlett, Toledo, Ohio; David C. Meissner, Charlotte, and Glenn E. Hoffman, Pineville, both of N.C., assignors to Midrex International B.V. Rotterdam, Zurich, Switzerland

Filed Oct. 3, 1985, Ser. No. 783,517

Int. Cl.[4] C21B *11/00*

U.S. Cl. 75—38 **13 Claims**



1. Apparatus for producing molten iron comprising:

a. a molten iron bath gasifier-melter having a top and a bottom;

b. an associated direct reduction shaft furnace having a metal oxide feed means at the top thereof and a metallized product removal means at the bottom thereof;

c. means for introducing particulate coal and oxygen through said bottom of said gasifier-melter;

d. inlet means positioned between said top and said bottom of said gasifier-melter for introducing direct reduced iron to said gasifier-melter;

e. a gasification gas outlet at the top of said gasifier-melter;

f. a first conduit communicating with said gasification gas outlet and a reducing gas inlet to said direct reduction shaft furnace;

g. a gas mixer in said first conduit;

h. a scrubber-cooler;

i. a reacted top gas outlet at the top of said shaft furnace;

j. a second conduit communicating with said scrubber-cooler and said reacted top gas outlet;

k. a carbon dioxide removal system;

l. a third conduit communicating with said scrubber-cooler and said carbon dioxide removal system; and

m. a fourth conduit communicating with said carbon dioxide removal system and said gas mixer.

4,685,965

PROCEDURE FOR DEOXIDIZING METAL MELTS

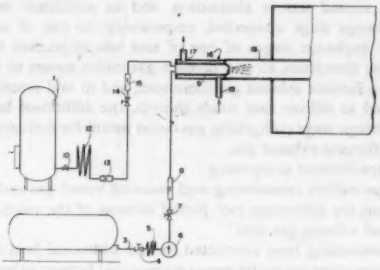
Reinhard Strigl, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Fed. Rep. of Germany

Filed Aug. 16, 1984, Ser. No. 641,517

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1983, 3330161

Int. Cl.[4] C22B *15/14*

U.S. Cl. 75—93 R 11 Claims



1. Procedure for deoxidizing metal melts, comprising,

adding to the melt a water containing liquid reducing agent selected from the group consisting of molasses and lignin, wherein the reducing agent decomposes and produces carbon, hydrogen, and hydrocarbons which have reducing effects, and wherein a part of the water occurring in the reducing agent forms CO and hydrogen, and another unconverted part creates a bath movement in the metal melt.

4,685,966

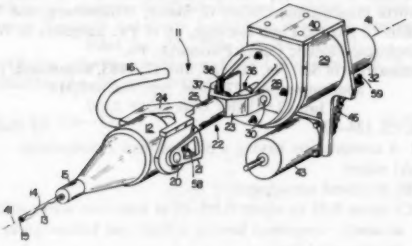
SURFACE TRACKING APPARATUS

Gerald D. Garner, and Walter E. Wozniak, both of Florissant, Mo., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Jul. 29, 1985, Ser. No. 760,265

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—583 17 Claims



1. An ultrasonic testing apparatus comprising:

sensing means which emits sensing signals when sensing;

a first linkage having said sensing means located at one end;

translation means for moving said first linkage relative to a test object;

first adjusting means for adjusting said first linkage;

means for mapping the topography of said test object; and

said first adjusting means receiving topographical data from said mapping means and adjusting said first linkage so that said sensing signals impinge at a desired angle of incidence on the surface of said test object.

4,685,967

DEICING COATING COMPOSITION

Naonori Enjo, Suita; Masayoshi Shinjo, Settsu; Yasuko Okazaki, Yamatokoriyama, and Kazunori Hayashi, Settsu, all of Japan, assignors to Daikin Industries Ltd., Osaka, Japan

Filed Apr. 28, 1986, Ser. No. 856,342

Claims priority, application Japan, May 2, 1985, 60-94888

Int. Cl.[4] C09K *3/18*

U.S. Cl. 106—13 6 Claims

1. A deicing coating composition characterized in that the composition comprises a synthetic resin coating composition of the organic solvent type and 0.1 to 75 parts by weight, per 100 parts by weight of the resin solids of the component composition, of at least one fluorine-containing compound selected from the group consisting of urethane, phosphate, phosphonic acid derivative, phosphinic acid derivative, polyether, polyester and polyvinyl compounds having a perfluoroalkyl group with 6 to 20 carbon atoms.

4,685,968

PROCESS FOR PREPARING INK COMPOSITIONS FOR INK-JETS PRINTERS

Donald J. Palmer, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 806,291, Dec. 5, 1985, abandoned. This application May 27, 1986, Ser. No. 866,894

Int. Cl.[4] C09D *11/00*

U.S. Cl. 106—23 22 Claims

1. A process for preparing an ink composition suitable for use in ink-jet printers comprising:

(a) forming a solution of a dye having at least one negatively charged functional group per molecule and a cationic compound selected from the group consisting of alkanol ammonium compounds and cationic amide compounds;

(b) acidifying said solution;

(c) cycling said solution through a reverse osmosis membrane to form a concentrate and a permeate, said concentrate including a cation of said compound ionically associated with at least one functional group of said dye and said permeate including a cation formerly associated with said at least one functional group;

(d) adding water and said cationic compound as necessary to said concentrate;

(e) concentrating said dye by reverse osmosis; and

(f) forming a solution of said concentrated dye with a glycol ether to form said ink composition having the desired concentration of ingredients.

4,685,969

PROCESS AND SEPARATING SUBSTANCE FOR REMOVING A CAVITY-POLYMERIZED INLAY CONSISTING OF A DENTAL FILLING COMPOSITE

Adalbert Schmid, Rebstein; Alfons Kiener, Heerbrugg; Stephan Kägi, Widnau, and Jean P. Claude, Altstätten, all of Switzerland, assignors to Coltene AG, Altstatten

Filed Nov. 26, 1985, Ser. No. 801,763

Claims priority, application Switzerland, Dec. 5, 1984, 5779/84

Int. Cl.[4] A61K *6/08*

U.S. Cl. 106—35 12 Claims

1. A process for filling a tooth cavity with a composite dental filling, said process comprising the steps of:

preparing the tooth cavity;

introducing a separating substance into said cavity to form a separating layer in said cavity, said separating substance decomposing at body temperature into a sol;

introducing a dental filling composite into said cavity;

partly hardening said composite in said cavity and roughly fitting said composite in said cavity to form a partly hardened filling;

removing said partly hardened filling from said cavity;

completing the hardening of the partly hardened filling to form a completely hardened filling;

removing said separating layer from said cavity; and

bonding said completely hardened filling in said cavity.

4,685,970

PROCESS AND APPARATUS FOR THERMALLY TREATING FINE-GRAINED SOLIDS, PARTICULARLY FOR BURNING GROUND RAW MATERIAL FOR MAKING CEMENT

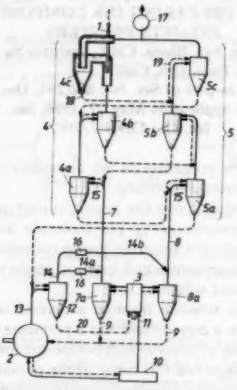
Franz Krennbauer, Linz, and Friedrich Fehringer, Ulmerfeld, both of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria and VEB Schwermaschinenbau-Kombinat "Ernst Thalman" Magdeburg, Magdeburg, German Democratic Rep.

Filed Nov. 22, 1985, Ser. No. 801,055

Claims priority, application Austria, Jan. 11, 1985, 57/85

Int. Cl.[4] C04B 7/43

U.S. Cl. 106—100 **8 Claims**



1. In a process of thermally treating fine-grained solids in first and second sets of heat exchange stages of a preheating multistage heat exchanger, in a reaction vessel and in a furnace, in that sequence, wherein mixed exhaust gases from said reaction vessel and from said furnace are conducted through first and second exhaust gas lines in heat transfer relation with said first and second sets, respectively, of heat exchange stages of said heat exchanger, said solids are transferred through the heat exchange stages of said first and second sets in alternation and are subsequently heated further in an additional heat exchange stage heated only with exhaust gas from said furnace, and said exhaust gas from said furnace which has flown through said additional heat exchange stage is mixed with said exhaust gas from said reaction vessel to form said mixed exhaust gases,

the improvement comprising the steps of

withdrawing two partial streams of reaction vessel exhaust gas from said reaction vessel,

withdrawing two partial streams of furnace exhaust gas which has flown through said additional heat exchange stage therefrom and mixing a respective one of said partial furnace exhaust gas streams with a respective one of said partial streams of reaction vessel exhaust gas to form first and second streams of mixed exhaust gases, and

supplying said first and second streams of mixed exhaust gases to said first and second exhaust gas lines, respectively.

4. In apparatus for thermally treating fine-grained solids, comprising

a multi-stage heat exchanger for preheating said solids,

a reaction vessel connected to said heat exchanger to receive preheated solids therefrom and comprising reaction gas outlet means for delivering reaction vessel exhaust gas,

a furnace connected to said reaction vessel to receive reacted solids therefrom and comprising furnace gas outlet means for delivering furnace exhaust gas, and

said heat exchanger comprising first and second sets of heat exchange stages, first and second exhaust gas lines in heat transfer relation with said first and second sets, respectively, of said heat exchange stages, means for transferring said solids through the heat exchange stages of said first and second sets in alternation, and an additional heat exchange stage connected, respectively, to one of said heat exchange stages of one of said sets to receive the solids therefrom, to said furnace gas outlet means to receive furnace exhaust gas therefrom, and to said reaction vessel to deliver said solids thereto, the additional heat exchange stage comprising gas outlet means for delivering the furnace exhaust gas,

the improvement comprising

two gas outlets constituting said reaction vessel gas outlet means for delivering two partial streams of the reaction vessel exhaust gas, and

two connecting lines connected to said additional heat exchange stage gas outlet means receive said furnace exhaust gas therefrom and to deliver two separate streams of the furnace exhaust gas to said reaction vessel gas outlets to mix each of said partial streams of reaction vessel exhaust gas with one of said partial streams of furnace exhaust gas and thus to produce first and second streams of mixed exhaust gases,

said reaction vessel gas outlets being connected to said first and second exhaust gas lines, respectively, to deliver said first and second streams of mixed exhaust gases thereto.

4,685,971

OZONE OXIDATION OF DEPOSITS IN COOLING SYSTEMS OF NUCLEAR REACTORS

Alexander P. Murray, Murrysville; Lawrence F. Becker, Jr., North Huntingdon; Clifton G. Slater, Wilkinsburg, and Michael C. Skriba, Plum Borough, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 513,134, Jul. 12, 1983, abandoned. This application Sep. 27, 1984, Ser. No. 655,319

Int. Cl.[4] G23G 1/00; G21F 9/00

U.S. Cl. 134—2 **12 Claims**

1. A composition having a pH less than 7 comprising:

(A) water;

(B) dissolved ozone; and

(C) about 0.01 to about 0.5% of at least one water-soluble aromatic compound having at least one ketone group on an aromatic ring.

4. A method of oxidizing chromium in deposits in the cooling system of a nuclear reactor comprising

(A) circulating through said cooling system a solution having a pH less than 7 which comprises

(1) water;

(2) dissolved ozone; and

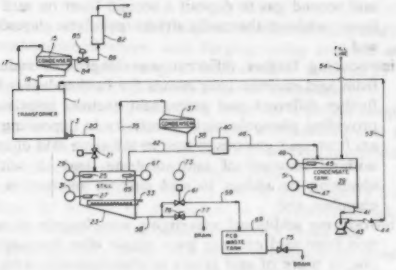
(3) about 0.01 to about 0.5% of a water soluble aromatic compound selected from the group consisting of quinone, naphthaquinone, and mixtures thereof; then

(B) injecting ozone into said solution as it circulates through said cooling system.

4,685,972
PROCESS FOR REMOVING PCB'S FROM ELECTRICAL APPARATUS

David E. Fowler, Gainesville, Fla., assignor to Quadrex HPS, Inc., Gainesville, Fla.

Filed Jul. 18, 1984, Ser. No. 631,909
Int. Cl.[4] B08B 5/00
U.S. Cl. 134—12 21 Claims

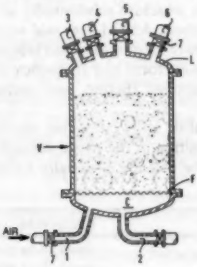


1. A process for removing polychlorinated biphenyls from an electrical apparatus comprising:
(a) filling the electrical apparatus with a dielectric fluid in liquid state in which polychlorinated biphenyls are soluble, thereby providing adequate insulation during the operation of the electrical apparatus;
(b) dissolving polychlorinated biphenyls contained within the electrical apparatus into said dielectric fluid to form a solution;
(c) conducting said solution from the electrical apparatus to a cleansing means;
(d) cleansing said solution to thereby separate polychlorinated biphenyls from said dielectric fluid so that said dielectric fluid is re-usable; and
(e) recirculating said dielectric fluid back to the electrical apparatus for reuse, said steps effectively and substantially removing the polychlorinated biphenyls from the electrical apparatus so that the leaching of residual polychlorinated biphenyls into the dielectric fluid will not exceed 50 ppm.

4,685,973
RECLAMATION OF FOUNDRY SANDS

Michael C. Ashton, Sheffield, England, assignor to Steel Castings Research and Trade Association, Sheffield, England

Filed Jan. 30, 1985, Ser. No. 696,282
Claims priority, application United Kingdom, Feb. 3, 1984, 8402856; Oct. 29, 1984, 8427335
Int. Cl.[4] B08B 7/04
U.S. Cl. 134—13 12 Claims

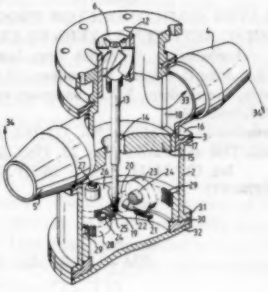


1. A method of reclaiming for re-use grains of silicate bonded particulate material including fine particles and sand comprising water-soluble binder products, comprising the steps of:
(a) placing an effective amount of water having a pH value below 10 and said particulate material in a vessel having a plenum chamber at the base and a suspended floor comprising a porous membrane,
(b) subjecting the mixture to agitation for sufficient time to dissolve said soluble binder products off said particulate material,
(c) stopping the agitation and leaving the unagitated mixture to allow the particulate material to settle on the porous membrane floor to form a bed comprising sand on the membrane and said fine particles on top of the said sand,
(d) withdrawing the water with the soluble binder products therein from the vessel through the bed and causing said fine particles to be filtered out of asid water and retained on said bed, and
(e) separating the fine particles from the sand after said water has been withdrawn.

4,685,974
METHOD FOR CLEARING SETTLED SLUDGE

John A. Furness, Addiscombe, and John Haggerty, Warlingham, both of England, assignors to Butterworth Systems, Inc., Florham Park, N.J.

Division of Ser. No. 301,414, Sep. 11, 1981, Pat. No. 4,407,678. This application Jun. 20, 1983, Ser. No. 505,703
Claims priority, application United Kingdom, Sep. 12, 1980, 8029639
Int. Cl.[4] B08B 3/02, 9/08
U.S. Cl. 134—22.18 2 Claims

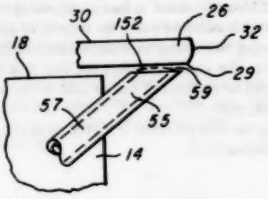


1. A method of clearing settled sludge from a circular storage tank having a bottom plane and a side wall and containing a quantity of stored crude oil, comprising the steps of pumping liquid crude oil through at least one sludge dislodging machine having an axis of rotation and two diametrically opposed liquid emitting nozzles, said at least one machine and associated nozzles being located adjacent a side wall of said tank and substantially above and spaced from the bottom plane of the tank, continuously rotating said at least one machine and associated nozzles about said axis of rotation so that the nozzles emit liquid in a sweep substantially parallel to the bottom plane of the storage tank, thereby re-suspending the sludge, blanking off the emission of liquid from each nozzle of said at least one machine during substantially 180° of its rotation to prevent liquid impingement against the tank side wall, and thereafter withdrawing the liquid crude oil in the tank and re-suspended sludge as a suspension.

4,685,975
METHOD FOR EDGE CLEANING

Rickie A. Kottman, Dallas; Robert E. Terrill, Carrollton, and Ann E. Wise, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 637,687, Aug. 3, 1984, abandoned, which is a continuation of Ser. No. 404,679, Aug. 3, 1982, abandoned. This application Feb. 27, 1986, Ser. No. 834,651
Int. Cl.[4] B08B 7/00
U.S. Cl. 134—33 21 Claims



1. A method for removing a deposit of material from an outer convex edge of an object having a substantially flat surface adjacent said edge comprising the steps of:

(a) providing a solvent at the outlet end of a nozzle in the form of a convex shaped reservoir created by surface tension forces of said solvent sufficiently close to said substantially flat surface to enable solvent transfer thereto;

(b) spinning said object;

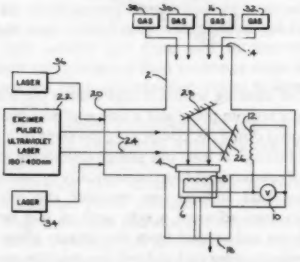
(c) transferring the solvent to said substantially flat surface by direct contact between the convex shaped reservoir located at the nozzle outlet and the spinning object;

(d) continuing the spinning of said object to bring the transferred solvent into contact with said edge to thereby remove said material deposit.

4,685,976
MULTI-LAYER SEMICONDUCTOR PROCESSING WITH SCAVENGING BETWEEN LAYERS BY EXCIMER LASER

Steven R. Schachameyer, Whitefish Bay; James A. Benjamin, Waukesha; John B. Pardee, Milwaukee, all of Wis., and Lyle O. Hoppie, Birmingham, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 721,783, Apr. 10, 1985, abandoned. This application May 22, 1985, Ser. No. 736,934
Int. Cl.[4] H01L 21/265; B05D 5/12
U.S. Cl. 437—173 12 Claims



1. A single chamber semiconductor processing technique for a multi-layered semiconductor structure, comprising:

providing a chamber capable of receiving gas;

placing a semiconductor wafer substrate in said chamber;

introducing a gaseous mixture of different gases into said chamber; and

providing excimer pulsed ultraviolet laser means and introducing radiation from said excimer laser means into said chamber at a first discrete wavelength to photolytically react with a first of said gases at a discrete excitation energy photochemically breaking bonds of said first gas to epitaxially deposit a first layer on said substrate, without thermally driven pyrolytic deposition,

introducing radiation from said excimer laser means into said chamber at a second discrete wavelength to photolytically react with a second of said gases at a discrete excitation energy photochemically breaking bonds of said second gas to deposit a second layer on said first layer, without thermally driven pyrolytic deposition, and

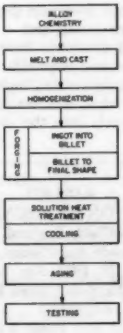
introducing further different wavelengths of radiation from said excimer laser means for further layers from further different said gases, said excimer laser means providing photochemical selectivity in depositing layers from said gaseous miture in the same said chamber without removal of said substrate, and all without changing or adding to said gaseous mixture in said chamber, and

introducing additional scavenging wavelengths of radiation from said excimer laser means after formation of one or more of said layers to photolytically treat and remove surface contaminants and scavenge the products of reaction of layer formation.

4,685,977
FATIGUE-RESISTANT NICKEL-BASE SUPERALLOYS AND METHOD

Keh-Minn Chang, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 3, 1984, Ser. No. 677,449
Int. Cl.[4] C22F 1/10
U.S. Cl. 148—12.7 N 16 Claims



11. The method of preparing a forged nickel-base superalloy body having its grain structure substantially all equiaxed with the grain size being about ASTM 5–6, said superalloy exhibiting fatigue crack growth rates at elevated temperatures largely independent of the waveform and frequency of fatigue stress intensity cyclically applied thereto, said method comprising the steps of:

(a) preparing an initial alloy consisting essentially of a mass having a composition in the range defined by the following table with the balance essentially nickel:

Element	Composition (wt %)
Cr	about 14 to about 18
Co	about 10 to about 14
Mo	about 3.0 to about 5.0
W	about 3.0 to about 5.0
Al	about 2.0 to about 3.0
Ti	about 2.0 to about 3.0

-continued

Element	Composition (wt %)
Nb	about 2.0 to about 3.0
Ta	0.0 to about 3.0
Ti + Nb/2 + Ta/4	about 3.5 to about 5.0
Zr	about .02 to about .08
B	about .01 to about .05
C	less than about 0.10

(b) forging said initial alloy mass to produce an alloy body of predetermined shape, said forging being initiated at a temperature in the range of from about 5° to about 25° C. higher than the γ' precipitate solvus temperature,

(c) solution annealing said alloy body for a period ranging from about 1 to about 4 hours at a temperature in the range of from about 5° to about 15° C. above the recrystallization temperature of the forged alloy,

(d) cooling said alloy body at a rate in the range of from about 80° to 150° C. per minute to a temperature below which further thermal reaction will not occur and

(e) aging said alloy body for a period ranging from about 8 to about 24 hours at one or more temperatures in the range of from about 600° to about 800° C.

4,685,978

HEAT TREATMENTS OF CONTROLLED EXPANSION ALLOY

John S. Smith, Proctorville, Ohio, and Darrell F. Smith, Jr., Huntington, W. Va., assignors to Huntington Alloys Inc., Huntington, W. Va.

Continuation-in-part of Ser. No. 409,838, Aug. 20, 1982, Pat. No. 4,487,743. This application Nov. 17, 1983, Ser. No. 552,949

The portion of the term of this patent subsequent to Dec. 11, 2001, has been disclaimed.

Int. Cl.[4] C21D *6/02;* **C22F** *1/10*

U.S. Cl. 148—142 **6 Claims**

1. A process for heat treating age hardenable, nickel-iron and nickel-cobalt-iron alloys, the alloys consisting essentially of about 34% to 55% nickel, up to 25% cobalt, about 1% to about 2% titanium, about 1.5% to about 5.5% columbium, about 0.25% to 1% silicon, up to about 1.25% aluminum, up to about 0.01% boron, up to 0.1% carbon, the balance essentially iron, said alloys when balanced in composition in accordance with

$$A=(\%Ni)+0.93(9\%\ Co)-1.46(\%Ti)+0.54\ (\%Si\%Cr)+1.37\ (\%Mn+\%Cu)+7.04\ (\%C)\ \text{At most}\ 52.9$$

$$B=(\%Ni)+0.97\ (\%Co)-1.15\ (\%Ti)-1.21\ (\%Si+\%Cr)+9.35(\%C)\ \text{At least}\ 43.6$$

exhibit in the age-hardened condition an Inflection Temperature of at least 625° F. and a Coefficient of Expansion no greater than 5.5×10^{-6} per °F. between ambient temperature and 780° which comprises (i) annealing the alloys at a temperature from about 1700° F. to about 1900° F. for a period of up to about 9 hours depending upon section size, (ii) cooling the alloy, (iii) aging the alloy at a temperature of from about 1300° F. to about 1500° F. for up to about 12 hours, depending upon section size, (iv) cooling the alloy to a second aging temperature, (v) aging at a temperature of about 1100° F. to about 1250° F. for up to 12 hours, and (vi) cooling the alloy to ambient temperature, said heat treatment being characterized in that the initial aging temperature of 1300° F. to 1500° F. and aluminum content are correlated such that as the aluminum content is increased above about 0.2% aging temperature is also increased within the said temperature range of 1300° F. to 1500° F.

4,685,979

METHOD OF MANUFACTURING A GROUP II-VI COMPOUND SEMICONDUCTOR DEVICE HAVING A PN JUNCTION

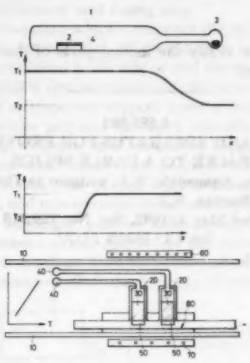
Jun-ichi Nishizawa, 6-16, Komegafukuro 1-chome, Sendai-shi, Miyagi-ken, Japan

Continuation-in-part of Ser. No. 628,974, Jul. 10, 1984, which is a continuation of Ser. No. 266,042, May 21, 1981, abandoned. This application Jul. 31, 1984, Ser. No. 636,408

Claims priority, application Japan, May 29, 1980, 55-79805

Int. Cl.[4] H01L *21/388*

U.S. Cl. 437—81 **10 Claims**



1. A method of manufacturing a semiconductor device having a single crystal pn junction formed in a Group II-VI compound semiconductor crystal, comprising:

growing a Group II-VI compound semiconductor crystal substrate having n type conductivity from a melt of a crystal-constituting Group VI elemeht other than Te and a Group II element;

forming a temperature difference in said melt by establishing a higher temperature zone in the upper region of the melt and a lower temperature zone in the lower region of the melt while holding the temperatures of the two zones constant and while constantly applying a vapor pressure of said Group VI element onto said melt throughout the growth of the crystal; and

forming, on said n type Group II-VI compound semiconductor crystal substrate, a semiconductor region of p type conductivity by diffusing an acceptor impurity into said n type Group II-VI compound semiconductor crystal under a predetermined vapor pressure of the crystal-constituting Group VI element.

4,685,980

METHOD FOR IMPROVING THE MAGNETIC PROPERTIES OF FE-BASED AMORPHOUS-ALLOY THIN STRIP

Takashi Sato, and Toshio Yamada, both of Kawasaki, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Division of Ser. No. 729,298, May 1, 1985. This application Feb. 12, 1986, Ser. No. 828,948

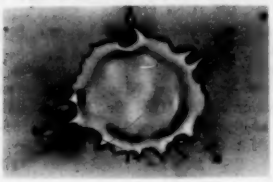
Claims priority, application Japan, May 4, 1984, 59-89947; Jul. 19, 1984, 59-148569

Int. Cl.[4] H01F *1/04*

U.S. Cl. 148—304 **3 Claims**

1. A core of a transformer excited at a commercial frequency and made of a thin strip of an Fe-based amorphous alloy,

characterized in that the surface of the thin strip is locally and instantaneously melted and is subsequently solidified by rapid



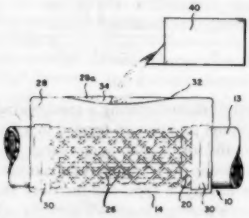
cooling to again vitrify the melted parts of the thin strip of amorphous alloy.

4,685,981

METHOD AND APPARATUS FOR PROVIDING A SPACER TO A CABLE SPLICE

Zoltan B. Dienes, Annandale, N.J., assignor to Thomas & Betts Corporation, Raritan, N.J.

Filed May 1, 1985, Ser. No. 729,315
Int. Cl.[4] H01B *13/22*
U.S. Cl. 156—48 **8 Claims**



1. A method of sealing a splice area in an electrical cable comprising the steps of:

(a) wrapping an open cell spacer web around said cable splice area;

(b) separately wrapping an adhesively coated liner around said cable splice area and said web, to form an open pocket, said adhesive coating of said liner being placed against said spacer;

(c) filling said pocket with cable encapsulating material; and

(d) sealably wrapping said filled pocket.

7. An apparatus for use in sealing a splice area of an electrical cable comprising:

an elongate, flexible ethylene vinyl acetate spacer web for surrounding and extending beyond said splice area of said cable, said spacer web being plastic and having a substantially planar construction and defining a pair of opposed planar surfaces having a plurality of opening therebetween for passage of cable encapsulating fluid, said spacer web further including one planar surface thereof having an adhesive coating thereon for adhesive engagement with said cable adjacent said splice area.

4,685,982

METHOD AND APPARATUS FOR SENSING SHEET-LIKE ELEMENTS

Leo Kucheck, Irvine, Calif., assignor to Label-Aire Inc., Fullerton, Calif.

Filed Apr. 2, 1985, Ser. No. 718,960
Int. Cl.[4] G06M *3/02*
U.S. Cl. 156—64 **8 Claims**

1. A labeling method comprising:

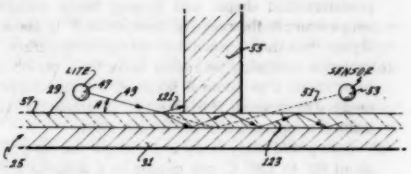
providing a label strip which includes an elongated essentially transparent web and a plurality of essentially transparent labels with the labels being on the elongated web and with adjacent labels being separated by a gap;

moving the label strip through a label sensing station;

placing a light barrier across the gap and over portions of the labels on opposite sides of the gap at the sensing station;

directing light from a source toward said label strip from one side of the barrier at the label sensing station so that the light is directed sequentially toward said labels and said web at said gaps;

said step of directing including directing the light against the label strip at an acute angle of incidence which is sufficiently small so that an optical signal is reflected from the web in the gap at the sensing station to the other side of the barrier and any portion of the light from the source which enters a transparent label when light is directed toward such label from the source is essentially captured by substantially total internal reflection within such transparent label;



detecting the optical signal on said other side of the barrier with a detector to thereby detect the presence of the gap at the sensing station; and

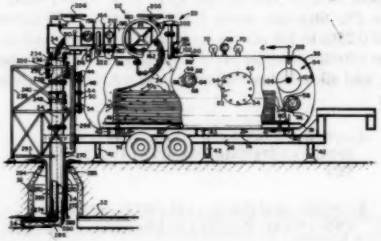
removing the labels from the web and applying them to articles.

4,685,983

METHOD AND APPARATUS FOR THE INSTALLATION OF A LINER WITHIN A CONDUIT

Charles A. Long, Jr., Birmingham, Ala., assignor to Long Technologies, Inc., Birmingham, Ala.

Filed Aug. 28, 1984, Ser. No. 645,123
Int. Cl.[4] B32B *31/12*
U.S. Cl. 156—64 **76 Claims**



1. Apparatus for installing a flexible tubular liner having a leading end and a trailing end within a pipe comprising:

means including a source of pressurized fluid for defining a pressurized region and for generating fluid pressure to insert the liner into the pipe;

an insertion conduit having an entry end and an exit end, the entry end of the insertion conduit being sealingly connected to the means defining the pressurized region and the exit end of the insertion conduit communicating with the pipe;

means on the exit end of the insertion conduit for sealingly clamping the leading end of the liner to the exit end of the insertion conduit and for creating a fluid tight seal between the liner and the exit end of the insertion conduit;

a first feed control means for substantially continuously

controlling the feed rate of the liner as one portion of the liner is inserted into the pipe, the first feed control means comprising;

a conveyor means having a slack conveyor belt,

an idler nip roller assembly including nip rollers juxtaposed in aligned spaced relationship to the conveyor means, the idler nip roller assembly including means for adjusting the compressive force of the nip rollers on the portion of the liner passing between the nip rollers and the conveyor means; and,

means for controlling the speed of the conveyor belt; and

a second feed control means for substantially continuously controlling the feed rate of the liner as the other portion of the liner is inserted into the pipe.

68. A method of installing a flexible liner impregnated with a thermosetting bonding resin into a manhole to be lined comprising:

(a) making a liner of resin absorbent material to have the shape and substantially the same dimensions as the side walls of the manhole, but including a bottom wall portion,

(b) impregnating the liner with a thermosetting bonding resin in an uncured condition,

(c) causing material in a pipe to which the manhole connects to bypass the junction where the manhole connects to the pipe,

(d) attaching one end of the liner to an annular flange above the manhole opening,

(e) securing positioning cables at several points to the side walls and bottom wall portion of the liner, the positioning cables being secured to one end of a feed control cable, the other end of the feed control cable being wound upon a cable reel means,

(f) inverting the liner into the manhole at a controlled feed rate, the feed rate being controlled by reel control means which controls the rate at which the feed control cable is unwound from the reel means to thereby control the tension of the feed control cable and the feed rate of the liner,

(g) expanding the liner against the walls of the manhole by pressurized fluid,

(h) retaining the liner in place within the manhole by mechanical abutment means,

(i) curing the resin by heating it to the curing temperature by heated fluid, and

(j) after the resin is cured, removing the curing fluid and the mechanical abutment means, and trimming any excess portions of the liner, including the bottom wall, so that the lined manhole is in substantially unblocked communication with the pipe.

4,685,984

IMAGE TRANSFER METHOD

Carol C. Powers, Madison, and Donald W. Lare, Greenville, both of Ohio, assignors to Avery International Corporation, Pasadena, Calif.

Continuation of Ser. No. 763,731, Aug. 9, 1985, abandoned, which is a continuation-in-part of Ser. No. 641,116, Aug. 15, 1984, abandoned. This application Aug. 6, 1986, Ser. No. 893,444

Int. Cl.[4] **B44C** *1/16, 31/00;* **B32B** *31/00*

U.S. Cl. 156—155 **2 Claims**

1. In a process for the transfer of indicia from a paper sheet to a backing member of fabric or the like which includes the steps of

combining an indicia carrier layer of tacky contact adhesive between a thermoplastic elastomer layer and a protective release liner, the latter being for protection of the tacky contact adhesive during distribution and storage,

providing either before, during or after said foregoing step a release-coated temporary support layer combined on the side of said thermoplastic layer that is remote to said indicia-carrying layer,

stripping said protective release liner after storage or transport and placing the remaining combined layers against the indicia-bearing face of said paper sheet with the carrier layer being against the paper sheet whereby the indicia and the paper sheet adhere to the carrier layer to produce an indicia-including sandwich of layers,

washing said indicia-including sandwich of layers in water to soften the paper and removing the paper and exposing the carrier layer with the indicia retained therein,

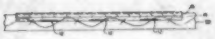
placing the remaining layers of the indicia-including sandwich of layers on the backing member with the surface of the indicia-retaining carrier layer against the backing member,

fusing said thermoplastic elastomer layer to the backing member along with the carrier layer and the indicia,

and stripping said temporary support layer following at least the initiation of said fusing step,

the improvement which comprises the steps of

including, in said step of providing a temporary support layer combined at the side of said thermoplastic elastomer layer that is remote to said indicia carrier layer, the provision of a temporary support layer of heat resistant water-impervious polymer having a non-silicone high release coating, whereby said temporary support layer of heat-resistant water-impervious polymer subsequently temporarily forms part of said indicia-including sandwich of layers, said non-silicone release coating not only establishing a uniformly positive differentiation of its potential high release action relative to the release action of said protective release liner such that said step of stripping the latter does not affect the integrity of stabilizing support to



be afforded by said temporary support layer to said indicia-including sandwich of layers, but also said non-silicone release coating establishing, together with said temporary support layer of heat-resistant water-impervious polymer, uniformity of its said potential high release action such that there will be no localized areas of abnormally high release when said temporary support layer is stripped fom the remainder of said indicia-including sandwich of layers following at least the initiation of said fusing step,

maintaining said temporary support layer of heat-resistant water-impervious plastic as part of said indicia-including sandwich of layers in overlying protective relation to said non-silicone release coating and the layers adjacent thereto during said step of washing and removing whereby not only is said sandwich of layers stabilized during said step of washing and removing, but also said potential uniform high release action of said non-silicone release coating, under protection of said water-impervious plastic temporary support layer, is unaffected by said washing and removing,

further maintaining said temporary support layer of heat-resistant water-impervious plastic as part of said indicia-including sandwich of layers during said placing step and the initiation of said fusing step to thereby utilize heat-resistant means to stabilize said indicia-including sandwich of layers during said times,

including in said fusing step the application of heat and pressure through said temporary support layer of heat-

resistant water-impervious plastic to the remainder of said indicia-including sandwich of layers and the backing member, whereby said thermoplastic elastomer layer along with said carrier layer and indicia are at least initially fused to the backing member by application of both heat and pressure through the temporary support layer and simultaneously to both the thermoplastic elastomer layer and the backing member to establish a firm and uniform bond between the backing member and said indicia-including sandwich of layers, the fusing step including exposure of said indicia-including sandwich of layers to a temperature of at least about 250° F.,

and, following said at least initial fusing, stripping said temporary support layer with its non-silicone release coating from said thermoplastic elastomer layer which is now firmly and uniformly bonded to the backing member, to thereby realize said potential uniform high release action vis-a-vis said firm and uniform bonding and thereby effect separation of said temporary support layer without degradation of the remainder of said indicia-including sandwich of layers or distortion or destruction of any portion of the indicia.

4,685,985

METHOD OF ENVELOPING METAL HOLLOWS WITH POLYETHYLENE

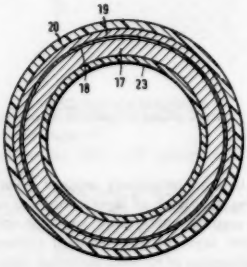
Walter Stueke, Ratingen, Fed. Rep. of Germany, assignor to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 791,690, Oct. 28, 1985, abandoned, which is a continuation of Ser. No. 562,511, Dec. 16, 1983, abandoned. This application Mar. 21, 1986, Ser. No. 842,779

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1982, 3247512

Int. Cl.[4] **B05D** *1/06, 1/24*

U.S. Cl. 156—185 **17 Claims**



1. Method of enveloping hollow objects having a temperature sensitive internal coating comprising the steps of heating the hollow object to a temperature of at least 80 degrees C. but well below a critical temperature of the sensitive coating;

providing a powder of an epoxy resin-curing agent blend being amendable to curing within 50 to 70 minutes at a temperature of 145 degrees to 155 degrees C.;

electrostatically applying the powder as precondensate powder coating upon the surface of the hollow object at a layer thickness from 30 to 50 micrometers;

applying externally heat to the powder coating for heating the powder coating to a temperature above 150 degrees C. until chemical reaction products have escaped;

providing a bonding layer that includes an ethylene copolymer, onto said epoxy layer and at a total layer thickness of at least 150 micrometers said bonding layer being applied as one or more coating layers, wherein each coating layer is applied to a thickness of at least 75 micrometers, and said step of providing a bonding layer including applying electrostatically a blend of a predried ethylene copolymer powder and of a powder of the epoxy resin-curing agent mixture, the epoxy resin-curing agent blend amounting to at least 30% of the mixture,

melting through external application of heat, each of these ethylene copolymer layers at a temperature of at least 180 degrees C.;

applying a polythylene layer upon the heated ethylene copolymer layer;

cooling the resulting composite hollow object to room temperature; and

each of the heating steps being of such duration and such limited temperature that the internal portions of the hollow object will remain at temperatures well below said critical temperature of said temperature sensitive coating.

5. Method as in claim 1 wherein said ethylene copolymer powder has a grain size distribution of about 70% 30 micrometer grain size, 20% 20 micrometer grain size and 10% 10 micrometer grain size.

4,685,986

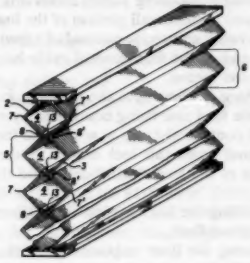
METHOD OF MAKING HONEYCOMB STRUCTURE WITH JOINED SINGLE PLEAT MATERIAL

Richard N. Anderson, Owensboro, Ky., assignor to Hunter Douglas, Inc., Totowa, N.J.

Division of Ser. No. 796,035, Nov. 7, 1985. This application Jun. 2, 1986, Ser. No. 869,865

Int. Cl.[4] **B32B** *3/12*

U.S. Cl. 156—197 **12 Claims**



1. The method of fabricating an expandable honeycomb structure of a plurality of cells, one on top of the other, comprising the steps of:

(a) continuously feeding a continuous length of a first material longitudinally of said length, said material having a first set of transverse creases spaced along the length thereof;

(b) continuously feeding a continuous length of a second material longitudinally of said length and toward said first material, said second material having a first set of transverse creases spaced along the length thereof; and

(c) joining the two materials together intermediate said first sets of creases.

4,685,987

METHOD OF PREPARING INTERFACINGS OF HEAT SINKS WITH ELECTRICAL DEVICES

Herbert J. Fick, Northfield, Minn., assignor to The Bergquist Company, Minneapolis, Minn.

Division of Ser. No. 529,033, Sep. 2, 1983, Pat. No. 4,602,678. This application Jan. 21, 1986, Ser. No. 820,216

Int. Cl.[1] **B32B** *31/16*

U.S. Cl. 156—247 **9 Claims**

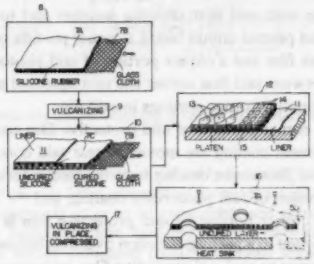
1. The method of preparing an interfacing for conducting heat between an electronic device or the like and a heat sink having complementary surfaces disposed to confront and communicate heat therefrom, comprising the steps of:

(a) producing a first thin and substantially amorphous layer of heat-conducting material having compliant properties of an elastomeric substance when cured;

(b) curing said layer to a dry and relatively firm state, apply-

ing and sticking to one side of said first layer a second thin layer of uncured heat-conducting material in a substantially amorphous condition;

(c) temporarily covering the exposed side of said second layer while it is in an uncured condition with a strippable liner removable to expose the material thereof for attachment to and subsequent curing and bonding with said complementary surfaces, said uncured material being one which tends to adhere to said first layer and said complementary surfaces and being controllably curable to form a permanent bond with both said one side of said first layer and said complementary surfaces of the heat sink;



(d) said steps of producing a first and second layer are carried out using a material consisting essentially of silicone rubber having relatively minute particles of heat-conducting material distributed therethrough and by applying the material in the substantially amorphous state to one side of a relatively thin carrier consisting essentially of glass fibers before curing it to form the first layer; and

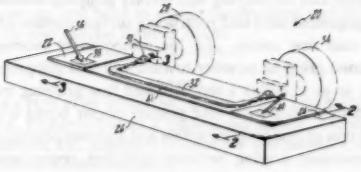
(e) said method further comprising the steps of stripping the liner away to expose the uncured material of the second layer, pressing the exposed uncured material of the second layer into substantially voidless engagement with the said complementary surfaces of a heat sink, and, while so pressing the material of the said second layer, curing that material in place.

4,685,988

BURIED MICROSTRIP NETWORK PROCESSING

Robert A. Wagner, Manchester, and Peter K. Cheo, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 4, 1985, Ser. No. 720,197
Int. Cl.[4] G02B 5/14
U.S. Cl. 156—250 **13 Claims**



1. The method of fabricating a electro-optic modulator for modulating an infrared laser signal at microwave frequencies, comprising the steps of:

forming a thin film waveguide having a waveguide length and width defining first and second major surfaces;

forming a dielectric wafer having an initial thickness and an initial width, and having first and second major surfaces;

plating metal to said wafer first major surface;

fabricating a metal base with an optically flat surface and a lengthwise channel formed therein, said channel having a bottom surface with a width greater than said wafer initial width and having a depth less than said wafer initial thickness, said depth being selected in dependence on the modulator's electrical characteristics;

bonding said wafer plated major surface to said channel bottom surface such that the bonded wafer abuts said channel sidewall;

thinning said bonded wafer until said wafer second major surface is essentially coplanar with said optically flat surface, thereby forming a hybrid surface having metal and dielectric wafer portions thereof;

cutting said bonded wafer lengthwise along a plane substantially perpendicular to said optically flat surface, to provide a metal base substrate assembly with a dielectric wafer at a final width selected in dependence on the modulator's electrical characteristics;

plating metal to a first portion of said waveguide first major surface, providing a second portion thereof unplated;

bonding said waveguide first major surface to said hybrid surface with said unplated second portion in register with said wafer portion of said hybrid surface; and

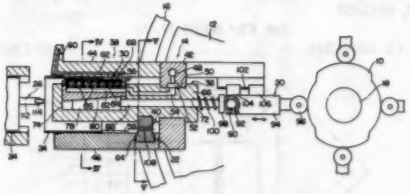
fabricating on said waveguide second major surface a ridge with a network electrode having a microstrip in register with said second portion and having launching transformers in register with said first portion.

4,685,989

PROCESS AND APPARATUS FOR PRODUCING WELDED CAN BODY WITH AN ORGANIC COATED WELDED PART

Kenji Matsuno; Hisakazu Yasumuro, both of Yokohama; Kazuo Taira, Tokyo; Tsuneo Imatani, Yokosuka, and Makoto Toyoshima, Tokyo, all of Japan, assignors to Toyo Seikan Kaisha Limited, Tokyo, Japan

PCT No. PCT/JP85/00029, § 371 Date Sep. 24, 1985, § 102(e) Date Sep. 24, 1985, PCT Pub. No. WO85/03252, PCT Pub. Date Aug. 1, 1985
PCT Filed Jan. 25, 1985, Ser. No. 783,381
Claims priority, application Japan, Jan. 25, 1984, 59-10300; Sep. 27, 1984, 59-200512; Dec. 27, 1984, 59-273746
Int. Cl.[4] B29C 63/00
U.S. Cl. 156—244.13 **15 Claims**



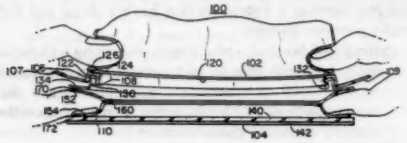
1. A process for producing a welded can body having an organic coated welded part, which comprises a loading step of loading a welded can body on a mandrel having a groove formed in a contacting portion; an adhering step of bringing the contacting portion of the mandrel into contact with the inner wall of the welded can body, forming the desired sealed space by the inside surface of the welded part and its vicinity to be organic coated and the groove of the mandrel and injecting a molten resin into the sealed space thereby to adhere the resulting tape-like resin to the welded part of the can body; and a separating step of separating the welded can body from the mandrel.

4,685,990

OSTOMY BAG COUPLING

Keith T. Ferguson, Scotch Plains, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 759,560, Jul. 26, 1985, Pat. No. 4,648,875.
This application Sep. 29, 1986, Ser. No. 912,716
Int. Cl.[4] B32B *31/00, 31/20*
U.S. Cl. 156—253 **5 Claims**



1. A method of mounting a plastic coupling member to a surface of an adhesive backed label, said coupling member used for detachably connecting an ostomy bag to said label, said method comprising the steps of:

providing a plastic coupling member and an adhesive backed label;

forming a flexible mounting member comprising first and second sections coupled together at an inner peripheral region which defines an aperture therein and each said section having an outer peripheral region spaced from said inner peripheral region;

coupling said plastic coupling member to said first section only at the outer peripheral region thereof;

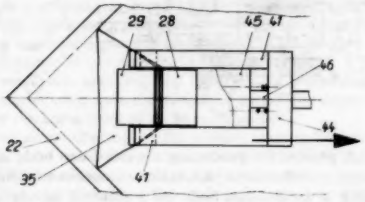
coupling said second section to a surface of said adhesive backed label only at the outer peripheral region of said second section so that said second section is movable away from said label in the region of the aperture.

4,685,991

PROCESS AND APPARATUS FOR PEELING A PROTECTIVE FILM FROM AN EXPOSED PHOTORESIST COATING ON A PRINTED CIRCUIT BOARD

Gunter Herrmann, Wiernsheim; Hans-Günter Löhr, Calw, and Josef W. Mozzi, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Lohr & Herrmann GmbH, Neuhausen, Fed. Rep. of Germany

Filed Jul. 25, 1986, Ser. No. 890,699
Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532553
Int. Cl.[4] B32B *31/16*
U.S. Cl. 156—344 **20 Claims**



1. In a process of peeling a rectangular protective film having diagonally opposite first and second corners from a photoresist coating which is provided on one side of printed circuit board and has a corner in register with said first corner of said protective film, said printed circuit board having on said one side a surface portion which protrudes from said photoresist coating at said corner thereof,

wherein said peeling of said protective film is initiated at said first corner and is continued as far as to said second corner, inclusive,

the improvement residing in that

said printed circuit board is held in a predetermined position,

a first gripping member is forced against said protective film adjacent to said first corner so as to form in said photoresist coating under said protective film a squeezed portion adjacent to but spaced from said first corner,

a second gripping member is engaged with said protruding surface portion adjacent to said first corner and is then moved toward said first gripping member so as to define a nip with said first gripping member and to detach from said printed circuit board a corner portion of said protective film and a corner portion of said photoresist coating between said first corner and said squeezed portion and to grip said corner portions in said nip,

said corner portions of said protective film and of said photoresist coating are moved to tear said corner portion of said photoresist coating from the remainder of said corner portion of said photoresist coating, and

said corner portion of said protective film is subsequently moved in a peeling direction over and beyond said second corner to peel said protective film, inclusive of said second corner, from said remainder of said photoresist coating.

2. Apparatus for peeling a rectangular protective film having diagonally opposite first and second corners from a photoresist coating which is provided on one side of printed circuit board and has a corner in register with said first corner of said protective film, said printed circuit board having on said one side a surface portion which protrudes from said photoresist coating at said corner thereof,

which apparatus comprises peeling means for initiating said peeling of said protective film at said first corner and for continuing said peeling as far as to said second corner, inclusive,

the improvement residing in that

said apparatus comprises a board-clamping device for clamping said printed circuit board and for holding it in a predetermined position,

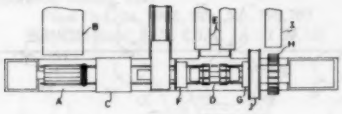
said peeling means comprise first and second gripping members for initiating said peeling at said first corner, actuating means for forcing said first gripping member against said protective film adjacent to said first corner so as to form in said photoresist coating under said protective film a squeezed portion adjacent to but spaced from said first corner and for moving said second gripping member into engagement with said protruding surface portion adjacent to said first corner and for subsequently moving said second gripping member toward said first gripping member so as to define a nip with said first gripping member and to detach from said printed circuit board a corner portion of said protective film and a corner portion of said photoresist coating between said first corner and said squeezed portion and to grip said corner portions in said nip and means for moving said corner portions of said protective film and of said photoresist coating away from said printed circuit board so as to tear said corner portion of said photoresist coating at said squeezed portion from the remainder of said photoresist coating, and for subsequently moving said corner portion of said protective film in a peeling direction over and beyond said second corner to peel said protective film, inclusive of said second corner, from said remainder of said photoresist coating.

4,685,992

APPARATUS FOR MANUFACTURING A RADIAL TIRE

Nobuhiko Irie, Nagasaki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 521,415, Aug. 8, 1983, abandoned, which is a division of Ser. No. 387,216, Jun. 10, 1982, Pat. No. 4,468,267. This application May 13, 1985, Ser. No. 733,535
Claims priority, application Japan, Jun. 18, 1981, 56-94381
Int. Cl.⁴ B29H *17/20, 17/22*
U.S. Cl. 156—396 **3 Claims**



1. An apparatus for manufacturing a radial tire which comprises:

a frame;

a carcass band asesmbling former rotatably mounted on said frame, said carcass bend assembling former having a ply former constructed so as to be expandable and contractable in the radial direction, said ply fomer comprising a plurality of axially elongated radially movable segments together forming an outer cylindrical surface having a diameter which is smaller than an inner diameter of a bead by a thickness of a carcass ply to be wound on said ply former, said segments mounted so that alternate segments are movable radially inwardly more than the remaining segments for converting a cylindrical carcass ply on said outer cylindrical surface into a corrugated shape along the entire axial length thereof;

means for holding a carcass ply in contact with the external surface of said ply former;

a carcass forming drum attached to said frame having a pair of symmetrically located shoulder formers constructed so as to expand and contract in the radial direction;

a pair of symmetrically located beaded lock seals mounted outwardly of said shoulder former, said bead lock seals being constructed so as to expand the contract in the radial direction;

a pair of symmetrically located turn-up bladders mounted outwardly of said bead lock seals, said turn-up bladders being mounted on said carcass forming drum so as to move toward and away from the opposite symmetrically located one in a synchronous and symmetrical relation;

means for transferring a carcass band from said ply former to said carcass forming drum, said transferring means having a bead holding device disposable over the external surface of said ply former so that a bead can be transferred onto a carcass ply of said ply former, and means for holding a carcass ply and bead to permit tansfer from said ply former to said carcass forming drum.

4,685,993

APPARATUS FOR BINDING PACKAGES TOGETHER

Kenneth A. Flaherty; Daniel J. Huber, and Robert T. Lewis, all of Louisville, Ky., assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Feb. 18, 1986, Ser. No. 830,401
Int. Cl.⁴ B65C *1/04*
U.S. Cl. 156—475 **5 Claims**

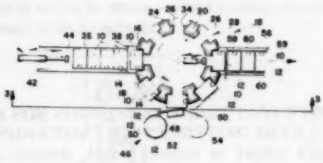
1. An apparatus for banding at least two stacked packages together in superimposed registered relationship comprising:

a rotatable turret having a plurality of stacked package receiving pockets spaced apart about the circumference of the turret, each pocket being open to the periphery of the turret;

means for rotating the turret;

stacked package feed means located at the periphery of the turret for guiding a stack of packages into the package receiving pockets;

band applicator means located at the periphery of the turret downstream of the package feed means relative to the direction of rotation of the turret for applying a band to the surfaces of the stack of packages in the pockets exposed at the pocket openings at the periphery of the turret symmetrically of the stacked packages with a portion of the band trailing behind the trailing edge of the package;



band folding means located at the periphery of the turret downstream of the band applicator means relative to the direction of rotation of the turret for folding the trailing edge of the band over the adjacent side of the package stack as the package stack is removed from the pockets; and,

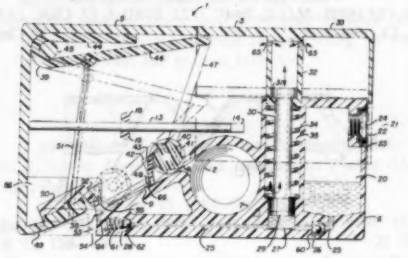
stacked package ejector means for removing the package stacks from the pockets in the turret into the band folding means.

4,685,994

POSTAGE STAMP DISPENSER

Tomasz J. Wodnicki, 6805 Veterans Blvd., Metairie, La. 70003

Filed Dec. 12, 1985, Ser. No. 808,297
Int. Cl.⁴ B32B *31/18*
U.S. Cl. 156—517 **13 Claims**



1. A dispenser for dispensing postage stamps from a roll of stamps, said dispenser comprising:

means for retaining a roll of stamps;

means for deploying said stamps in series from said means for retaining;

means for moistening a stamp, deployed by said means for deploying, including means for spraying water onto an adhesive-coated side of said stamp; and

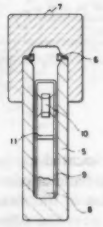
means for separating said stamp moistened by said means for moistening from any stamps remaining in said dispenser.

4,685,995

PROCESS FOR MANUFACTURING CALCIUM CARBONATE SINGLE CRYSTAL

Shinichi Hirano, 123, Meidai Yada-cho Syukusya, 66, Yada-cho 2-chome, Higashi-ku, Nagoya-shi, Aichi-ken, Japan, assignor to Shinichi Hirano and Seiko Instruments & Electronics Ltd., both of Tokyo, Japan

Filed Mar. 18, 1986, Ser. No. 840,670
Claims priority, application Japan, Mar. 18, 1985, 60-53892
Int. Cl.[4] C30B *29/10, 7/10;* C01F *5/24*
U.S. Cl. 156—623 R 29 Claims



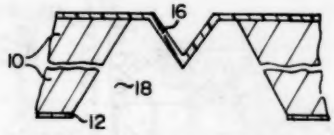
1. A method of manufacturing calcium carbonate single crystal wherein the calcium carbonate single crystal is grown by hydrothermal synthesis which applies heat and pressure to a starting material composed of calcium carbonate crystal within a chloride aqueous solution, said hydrothermal synthesis being carried out at a temperature above 470° C.

4,685,996

METHOD OF MAKING MICROMACHINED REFRACTORY METAL FIELD EMITTERS

Heinz H. Busta, 223 N. Home, Park Ridge, Ill. 60068, and Raul D. Cuellar, 6118 S. 31st St., Greenfield, Wis. 53221

Filed Oct. 14, 1986, Ser. No. 918,034
Int. Cl.[4] H01L *21/306;* B44C *1/22;* B05D *5/12;* C03C *15/00*
U.S. Cl. 156—628 19 Claims



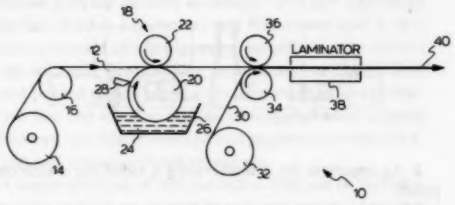
1. A method of making a field-emitter structure comprising the steps of:
(a) providing a substrate of single crystal silicon having a front surface and a back surface;
(b) etching the front surface of the substrate to form at least one funnel-shaped recess in the substrate;
(c) diffusing an impurity into the etched substrate front surface to form an etch-stop layer;
(d) etching the back surface of the substrate to remove the single crystal silicon down to the etch-stop layer; and
(e) conformally depositing a refractory metal onto the etched back surface of the substrate.

4,685,997

PRODUCTION OF DEMETALLIZED PACKAGING MATERIAL

Donald E. Beckett, 963 Tennyson Ave., Mississauga, Ontario, Canada L5H 2Y9

Filed Jun. 16, 1986, Ser. No. 874,406
The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.
Int. Cl.[4] B44C *1/22;* C23F *1/02*
U.S. Cl. 156—629 10 Claims



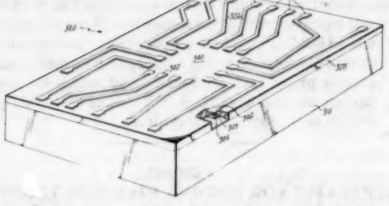
1. A method of forming a patterned packaging material, which comprises:
providing a first web of metallized material,
providing a second web of material which is laminatable to the first web,
printing a pattern of etchant material on one of the webs, and
laminating the first web to the second web with said pattern of etchant material sandwiched between the metallized surface of the first web and the abutting face of the second web.

4,685,998

PROCESS OF FORMING INTEGRATED CIRCUITS WITH CONTACT PADS IN A STANDARD ARRAY

Quinn, Daniel J., Carrollton; Wayne A. Mulholland, Plano; Robert H. Bond, Carrollton; Michael A. Olla, Flower Mound; Jerry S. Cupples, Carrollton; Ilya L. Tsitovsky, Farmers Branch; Barbara R. Mozdzen, Carrollton; Charles F. Held, The Colony; Linda S. Wilson, Pilot Point, and Yen T. Nguyen, Grand Prarie, all of Tex., assignors to Thomson Components - Mostek Corp., Carrollton, Tex.

Division of Ser. No. 592,186, Mar. 22, 1984, abandoned. This application Oct. 9, 1986, Ser. No. 917,040
Int. Cl.[4] B44C *1/22;* B29C *37/00;* H01L *23/48, 29/44*
U.S. Cl. 156—633 3 Claims



1. A method of attaching electrical leads to an integrated circuit having a plurality of electrical devices connected in an electrical circuit by a network of electrical conduction paths to a first array of input/output contacts comprising the steps of:
applying a layer of dielectric over said electrical circuit;
opening apertures in said layer of dielectric above said first array of input/output contacts;
applying a network of electrically conductive paths between said first array of input/output contacts and a second array of input/output contacts disposed in a predetermined pattern on said layer of dielectric;
placing an array of electrically conductive leads having

attachments tips in proximity to said second array of input/output contacts; and

simultaneously forming an electrically conductive bond between at least some of said second array of input/output contacts and at least some of said attachment tips.

4,685,999

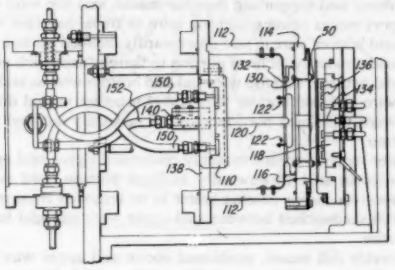
APPARATUS FOR PLASMA ASSISTED ETCHING

Cecil J. Davis, Greenville; Duane E. Carter, Plano, and Rhett B. Jucha, Celeste, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 24, 1985, Ser. No. 790,707

Int. Cl.[4] **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **20 Claims**



17. A method for plasma-assisted etching of integrated circuit structures, comprising the steps of:

supporting a wafer face down;

supplying a flow of process gasses to a chamber contiguous with the underside of said supported wafer; and

applying rf power to said chamber to generate a plasma in proximity to the underside of said wafer;

wherein said process gasses are supplied using an orifice pattern and pressure such that transport of said process gasses (and of reaction products of said process gasses) to said face of said wafer is dominated by diffusion.

4,686,000

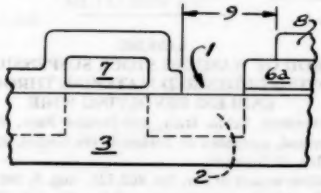
SELF-ALIGNED CONTACT PROCESS

Barbara A. Heath, 615 Hempstead Pl., Colorado Springs, Colo. 80906

Continuation-in-part of Ser. No. 719,073, Apr. 2, 1985, abandoned. This application Feb. 19, 1986, Ser. No. 831,463

Int. Cl.[4] **H01L** *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **10 Claims**



1. A process of fabricating a contact window in a semiconductor structure with a substrate, intermediate and upper conducting or semiconducting levels, and an interlevel dielectric, the process comprising the steps of:

fabricating a partially complete structure having a substrate and an intermediate level;

establishing an etch stop on exposed top and sidewall surfaces of said partially complete structure; and

adding the interlevel dielectric;

positioning contact window locations;

etching through said interlevel dielectric at said contact window locations to said etch stop;

etching anisotropically at said contact window locations through said etch stop and underlying insulation to expose an area to which contact is to be made but not entirely through insulation covering an element to which contact is not to be made at the contact window and leaving etch stop on said sidewall surfaces thereof so that the contact window can partially overlie a member to which electrical contact is not to be made without causing the circuit being formed to be inoperable.

4,686,001

METHOD FOR FORMING CONTACT LAYER ON SEMICONDUCTOR LIGHT EMITTING DEVICE

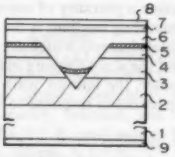
Niro Okazaki, Isehara, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

Filed Dec. 23, 1985, Ser. No. 812,656

Claims priority, application Japan, Dec. 26, 1984, 59-277539

Int. Cl.[4] **H01L** *21/208, 21/306, 33/00*

U.S. Cl. 156—652 **3 Claims**



1. A method for producing a semiconductor light emitting device wherein a contact layer of indium gallium arsenic phosphorus (InGaAsP) is formed on a semiconductor layer, comprising the steps of:

forming an InGaAsP contact layer on a semiconductor layer;

subsequently, forming an InP cover layer on said InGaAsP contact layer;

removing surface In from the InP cover layer by cleaning the surface of said InP cover layer with a solution which selectively melts indium but not InP; and

removing said InP cover layer from said InGaAsP contact layer by a selective etching process using an etchant which dissolves InP but not InGaAsP.

4,686,002

STABILIZED CHOLINE BASE SOLUTIONS

Carl J. Tasset, Springfield, Mo., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 18, 1986, Ser. No. 887,674

Int. Cl.[4] **C23F** *1/02;* **B44C** *1/22;* **C09K** *13/02;* **B29C** *37/00*

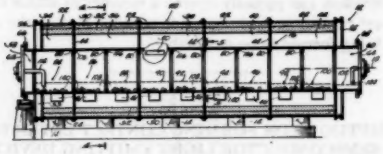
U.S. Cl. 156—659.1 **21 Claims**

20. A method of etching a metal layer in the surface of an intermediate product obtained in the manufacture of a semiconductor device which comprises contacting the surface of an intermediate product obtained in the manufacture of a semiconductor device having a metal layer thereon with a solution at a temperature and for a time sufficient to etch at least a portion of the metal layer, the solution comprising an effective amount of choline base; a solvent selected from the group consisting of water, lower alkanols, and mixtures thereof; and a stabilizing concentration of a stabilizer selected from the group consisting of formaldehyde, paraformaldehyde, and a mixture thereof.

4,686,003
PRECIPITATION OF SCALE-FORMING MATERIALS FROM SOLUTION

William A. Hockings, Houghton, and Duane M. Thayer, Chassell, both of Mich., assignors to Board of Control of Michigan Technological University, Houghton, Mich.

Filed Dec. 10, 1982, Ser. No. 445,224
Int. Cl.[4] B01D *1/00*
U.S. Cl. 159—47.3 9 Claims



1. A method for precipitating dissolved scale-forming material from a solution including the steps of:

(a) providing an elongated, cylindrical distillation chamber mounted for rotation about a generally horizontal axis and including a plurality of axially spaced annular baffles extending radially inwardly from the interior wall of said chamber at a height less than the inside radius of said chamber to define a plurality of compartments;

(b) providing a tumbling medium in the compartments comprising individual elements which are inert with respect to the solution and the scale-forming material and which rub against each other, the interior walls of the chamber and the sides of the baffles in response to rotation of the chamber;

(c) rotating the chamber at non-centrifuging speed with respect to the solution and the tumbling medium;

(d) continuously introducing the solution into an inlet end of the chamber in a sufficient quantity to flow over the baffles toward the opposite, outlet end of said chamber;

(e) heating the solution in the chamber above its boiling point to evaporate a portion of the volatile materials and precipitate the scale-forming material from the solution as it flows through the chamber;

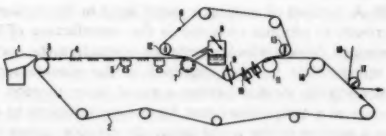
(f) continuously withdrawing a slurry containing the precipitated scale-forming material from the outlet end of the chamber; and

(g) continuously withdrawing gases evaporating from the soultion from the inlet end of the chamber to thereby provide countercurrent flow of the evaporated gases and the solution.

4,686,004
TWIN-WIRE FORMER FOR PAPERMAKING MACHINE

Haruyoshi Fujiwara, Mihara, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 683,198, Dec. 18, 1984, abandoned.
This application Sep. 21, 1986, Ser. No. 906,654
Claims priority, application Japan, Dec. 30, 1983, 58-246717
Int. Cl.[4] D21F *1/36, 1/40*
U.S. Cl. 162—300 3 Claims



1. A twin-wire former for a papermaking machine comprising:

a bottom wire arranged to travel in a loop, said bottom wire supported by means dividing a top run into four successive, continguous portions in the traveling direction of said bottom wire, said portions comprising a horizontal portion where said bottom wire is adjacent to a head box which ejects a wet material onto said bottom wire as said bottom wire travels horizontally past said head box, a downwardly inclined portion, an upwardly inclined portion and a final portion;

supporting member means provided under said top run of said bottom wire, said supporting member means being located at a position where said horizontal portion of said bottom wire joins said downwardly inclined portion of said bottom wire;

a top wire arranged to travel in a loop, said top wire being supported by top wire support means, said top wire support means disposed above said bottom wire and causing said top wire to approach said bottom wire at a position above said supporting member means, said top wire support means causing said top wire to travel together with said bottom wire in said downwardly inclined portion and said upwardly inclined portion to thereby sandwich material between said top wire and said bottom wire as said top wire and said bottom wire travel together in said downwardly inclined portion and said upwardly inclined portion;

water receiver means movably positioned above said upper wire in said downwardly inclined portion, said water receiver means causing water to be removed from material sandwiched between said upper wire and said lower wire;

movable roll means, positioned above said upper wire and said lower wire at a position where said downwardly inclined portion joins said upwardly inclined portion, and being movable towards and away from said top and bottom wires for adjusting the contact angle between said supporting member means and said upper and lower wires;

suction box means, movable towards and away from said top and bottom wires, positioned along said upwardly inclined portion; and

couch roll means provided under said top run of said bottom wire, said couch roll means located at a position where said upwardly inclined portion joins said final portion, said couch roll means positioned relative to said top wire support means for causing said upper wire to separate from said lower wire as said upper and lower wires pass by said couch roll means, said couch roll means comprising a couch roll having an axis of rotation and said movable roll means being mounted on support means for rotating said movable roll means about said axis of rotation of said couch roll, and said movable roll means supported by said support means is movable towards and away from said upper wire and said lower wire along a circular path centered on said axis of rotation of said couch roll.

4,686,005
METHOD OF WASHING STOCK SUSPENSIONS BY REMOVING UNDESIRED MATERIAL THROUGH AN ENDLESS REVOLVING WIRE

Mario Biondetti, Schio, Italy, and Roland Baur, Weingarten, Switzerland, assignors to Escher Wyss GmbH, Ravensberg, Fed. Rep. of Germany

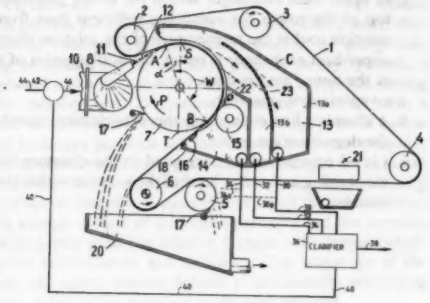
Continuation-in-part of Ser. No. 405,525, Aug. 5, 1982, Pat. No. 4,501,040, which is a continuation of Ser. No. 226,200, Jan. 19, 1981, abandoned. This application Dec. 24, 1984, Ser. No. 685,760
Claims priority, application Switzerland, Feb. 6, 1980, 931/80
The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.
Int. Cl.[4] D21C *9/06*
U.S. Cl. 162—60 8 Claims

1. A method of washing a stock suspension for removing therefrom undesired materials, comprising the steps of:

driving a rotatable solid cylinder and an endless revolving wire such that the speed of the endless revolving wire and the circumferential speed of the rotatable solid cylinder is in the order of about 400 to 1,200 meters per minute;

infeeding a stock suspension from which undesired materials are to be removed between said rotatable solid cylinder and said endless revolving wire;

exerting pressure on the stock suspension located between the endless revolving wire and the surface of the rotatable solid cylinder in order to outwardly express through the endless revolving wire undesired materials contained in the stock suspension while forming a fiber web from the



stock suspension between the endless revolving wire and the surface of the rotatable solid cylinder, which fiber web has a weight of less than 100 grams per square meter throughout the thus formed fiber web;

outfeeding the fiber web from between the rotatable solid cylinder and the endless revolving wire at a run-off location of the endless revolving wire from the solid cylinder; and

disintegrating the fiber web formed from the stock suspension between the rotatable solid cylinder and the endless revolving wire upon departure of the fiber web from between the rotatable solid cylinder and the endless revolving wire.

4,686,006

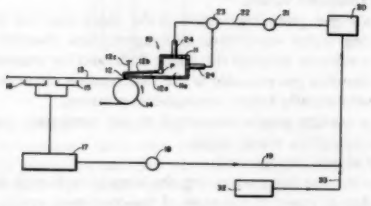
APPARATUS AND METHOD FOR THE MANUFACTURE OF FIBROUS WEBS

James O. Cheshire, Neenah; Robert J. Marinack, Oshkosh; Johannes A. Van den Akker, and Douglas L. Lindgren, both of Appleton, all of Wis., assignors to James River - Norwalk, Inc., Norwalk, Conn.

Continuation of Ser. No. 600,679, Apr. 16, 1984, abandoned. This application Feb. 6, 1986, Ser. No. 827,281

Int. Cl.⁴ D21F *1/02*

U.S. Cl. 162—336 **3 Claims**



1. In apparatus for the manufacture of a wet laid fibrous web, an improved headbox capable of producing a foam-fiber dispersion from an unfoamed feedstock comprising air and papermaking fibers dispersed in a foamable aqueous carrier medium comprising water and a surfactant and directing resulting foam-fiber furnish onto a forming wire which comprises

a closed channel longitudinal headbox of rectangular cross section having parallel planar front and back walls and parallel planar top and bottom walls,

a longitudinal outlet in the lowermost portion of said front wall for dispensing foam-fiber furnish through a slice or nozzle onto a forming wire,

a first longitudinal array of fluid inlet nozzles uniformly spaced along the upper wall of said headbox channel for connection to a supply of pressurized feedstock arranged to forcibly discharge feedstock onto the bottom wall of said headbox along a vertical plane perpendicular thereto, and

a second longitudinal array of fluid inlet nozzles uniformly spaced along the rear wall of said headbox channel for connection to a supply of pressurized feedstock arranged to forcibly discharge feedstock onto the front wall of said headbox along a plane parellel to the plane of said bottom wall thereof and perpendicular to the plane of said first array of nozzles in non-intersecting relationship with feedstock discharged from said first array to forcibly discharge feedstock onto the front wall of said headbox, thereby producing a foam-fiber furnish in said headbox immediately prior to its discharge through said outlet onto a forming wire.

4,686,007

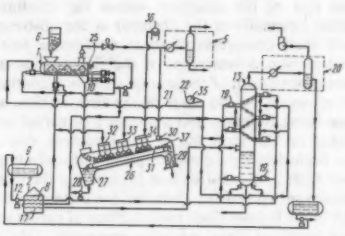
METHOD OF THERMALLY DECOMPOSING POLYMERIC MATERIAL

Genrikh D. Lyakhevich, Minsk; Anatoly P. Khimanych, Bobruisk; Vasily G. Suzansky, Bobruisk, and Vulf P. Kovalerchik, Bobruisk, all of U.S.S.R., assignors to Belorussky Politekhnichesky Institut, Minsk, U.S.S.R.

Division of Ser. No. 505,277, Jun. 17, 1983, Pat. No. 4,552,621. This application Jul. 17, 1985, Ser. No. 755,908

Int. Cl.⁴ C07C *4/00*; C10B *57/04*

U.S. Cl. 201—3 **1 Claim**



1. A method of thermally decomposing a solid polymeric material containing metal and/or cord lumps, which comprises the steps of:

partially thermally decomposing the polymeric material in the presence of a solvent and producing a suspension comprising a liquid fraction and a solid fraction containing the metal and/or cord lumps;

directing the suspension to a metal-and-cord separator comprising an enclosed inclined conveyor;

depositing the suspension on a lower end of the conveyor and separating the solid fraction from the liquid fraction by conveying the solid fraction upwardly and discharging the liquid fraction flowing off the lower end of the conveyor flushing the separated solid fraction on the conveyor with preheated solvent, applying stripping steam to the separated solid fraction on the conveyor after having been flushed with the preheated solvent, and drying the separated solid fraction on the conveyor after having been stripped with steam, and discharging the dry separated solid fraction from an upper end of the conveyor; and

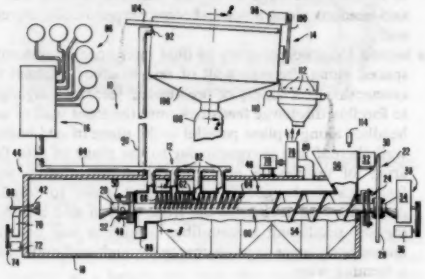
completely thermally decomposing the separated liquid fraction discharged from the conveyor to produce gaseous and liquid thermal decomposition products.

4,686,008

PYROLYTIC DECOMPOSITION APPARATUS

Harry T. Gibson, P.O. Box 122, Thurmont, Md. 21788

Filed Oct. 8, 1985, Ser. No. 785,394
Int. Cl.[4] C10B 7/10
U.S. Cl. 202—118 **7 Claims**



1. Apparatus for pyrolytic decomposition of vehicle tires comprising: a horizontally elongated pyrolysis chamber having indirect heating means, a shredded tire feed hopper communicating with the interior of the chamber at an upstream end of the chamber and an outlet means for residue comprising carbon particles, partially decomposed rubber, fiberglass and metallic particles from the chamber at a downstream end of the chamber, a hollow-shaft mounted in said chamber for conveying material therethrough and having one end rotatably extending through a sealed wall at the upstream end of said chamber for rotation on a horizontal axis, and an opposite end rotatably extending through a sealed end wall at the downstream end of the chamber; means for rotating the shaft mounted externally of the chamber at the upstream end; said hollow shaft comprised of three sections, a first section, a second section downstream of the first section and a third section downstream of the second section, a continuous screw flight mounted on the shaft in the first section, said second section being flightless and a plurality of partial screw flights mounted on the shaft in the third section; said continuous screw flight having a constant pitch and extending along the hollow shaft in the first section from below the feed hopper at the upstream end of the chamber for a length about 1/5 the length of the hollow shaft; said plurality of partial screw flights having upstream flights with the same pitch as the pitch of the first continuous screw flight and downstream flights having progressively less pitch in a downstream direction; said partial screw flights terminating upstream of the opposite end of the hollow shaft at the downstream end of the chamber; and means for withdrawing gaseous pyrolysis products from the chamber and directing said gaseous products to a fractionating device.

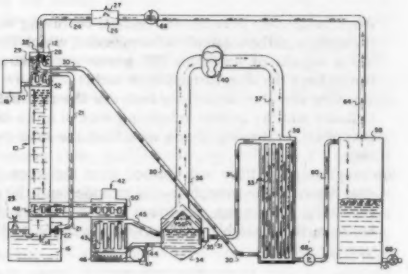
4,686,009

DISTILLATION SYSTEM

Derald L. McCabe, Dumas, Tex., assignor to James W. Laney, Sunray, Tex., a part interest

Filed Oct. 29, 1985, Ser. No. 792,548
Int. Cl.[4] B01D 3/10
U.S. Cl. 202—176 **4 Claims**

1. Apparatus for water distillation comprising:
a. means defining a source of solution that includes water,
b. a supply tank,
c. a supply line connecting the source of solution to the supply tank,
d. a supply control means connected to the supply line for maintaining a supply level of the solution within the supply tank,
e. a vent means connected to the supply tank,
f. a degasification tower having sides, a top, and a bottom, said tower extending from above the supply tank to below the supply level within the supply tank,
g. a vacuum pump means connected to the degasification tower proximate the tower top for maintaining a tower gas pressure substantially below atmospheric pressure,
h. a lower heat exchanger in the tower, proximate the bottom of the tower, for adding heat to solution within the tower,
i. an upper heat exchanger within the tower proximate the top of the tower for removing sufficient heat from the solution so that the temperature of the solution above the upper heat exchanger is below the boiling point of water at the tower gas pressure,
j. a vaporization chamber,
k. a chamber line connecting the vaporization chamber to the degasification tower,
l. a level control means connected to the chamber line for maintaining a chamber level of the solution within the said chamber,



m. a heater means connected to the vaporization chamber for maintaining the solution within the vaporization chamber at a chamber temperature that is substantially below the atmospheric boiling point of water,
n. a condenser vessel,
o. a vapor duct connecting the vaporization chamber to the condenser vessel,
p. a vapor pump connected to the vapor duct for transferring water vapor from the vaporization chamber to the condenser through the vapor duct: and for maintaining a chamber gas pressure in the vaporization chamber that is substantially below atmospheric pressure,
q. a cooling means connected to the condenser vessel for cooling the water vapor;
r. a closed storage tank,
s. a storage line connecting the storage tank with the condenser vessel at a bottom of the condenser vessel,
t. a vacuum valve connected to the storage tank for maintaining a storage gas pressure within the storage tank that is less than atmospheric pressure and greater than the vaporization chamber gas pressure and the degasification tower gas pressure.

4,686,010

PROCESS FOR THE PRODUCTION OF NON-AQUEOUS HYDROGEN PEROXIDE SOLUTIONS AND THEIR USE

Karlheinz Drauz, Freigericht, and Axel Kleemann, Hanau, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 510,162, Jul. 1, 1983, Pat. No. 4,564,514. This application Sep. 7, 1984, Ser. No. 648,137

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1983, 3334854

The portion of the term of this patent subsequent to Jan. 14, 2003, has been disclaimed.

Int. Cl.[4] B01D *3/36*

U.S. Cl. 203—63 17 Claims

1. A process for the production of a substantially water-free solution of hydrogen peroxide in a member of the group consisting of phenol per se, an alkyl phenol, an aryl phenol, a halophenol and a phenyl alkyl ether, which comprises mixing (1) the member and (2) aqueous hydrogen peroxide with a solvent or mixture of solvents whose boiling point is below that of hydrogen peroxide and the member at normal pressure, which solvent forms a homogeneous solution with both (1) and (2) and only forms an azeotrope with water whose boiling point is below that of hydrogen peroxide and the said member, which solvent is inert of hydrogen peroxide and the member and is separated from the solution formed of hydrogen peroxide in the said member, and distilling off an azeotrope of the solvent and water leaving behind a substantially water-free solution of hydrogen peroxide in the said member.

4,686,011

METHOD FOR THE PROTECTION OF AND/OR MONITORING OF CHANGES IN A REFERENCE SYSTEM IN ANALYTICAL MEASURING ENGINEERING, AND REFERENCE SYSTEM WITH A REFERENCE ELECTRODE

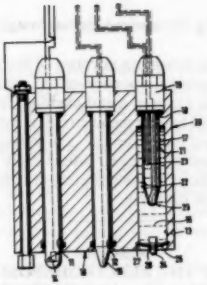
Heiner G. Jäckle, Stuttgart, Fed. Rep. of Germany, assignor to Conducta Gesellschaft fur Mess-und Regeltechnik mbH + Co., Gerlingen, Fed. Rep. of Germany

Filed Mar. 29, 1985, Ser. No. 717,340

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1984, 3411799; Mar. 26, 1985, 3510868

Int. Cl.[4] G01N *27/30, 27/46*

U.S. Cl. 204—1 T 14 Claims



1. In a method for measuring ion concentrations and activities in a measured fluid with potentiometric measuring electrode for producing constant reference voltages comprising an electrolyte bridge system having a reference electrolyte and a bridge electrolyte with first and second diaphragms arranged in series with the bridge electrolyte therebetween, the improvement comprising monitoring changes in a reference system leading to potential drifts by the steps of detecting the occurrence of a potential difference resulting from a difference in pX value between the reference electrolyte and the bridge electrolyte and producing a fault signal when such difference occurs.

5. In a system for measuring ion concentrations and activities in a measured solution with a reference system including a reference electrode and a reference electrolyte and a potentiometric measuring pX electrode comprising a vessel having a first bridge electrolyte connected with a measured solution via a first diaphragm, said reference electrolyte comprising a second inner electrolyte which is connected with the first bridge electrolyte via a second diaphragm, the improvement comprising: means for monitoring changes in the reference system leading to potential drifts comprising an additional monitor electrode for measuring the pX value of the first bridge electrolyte and wherein the first bridge electrolyte has the same pX value as the reference electrolyte.

4,686,012

ION-SELECTIVE MEASURING ELECTRODE DEVICE

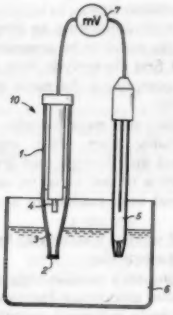
John E. Engell, Rungsted Kyst, and Svend Mortensen, Copenhagen, both of Denmark, assignors to Radiometer A/S, Copenhagen, Denmark

Continuation of Ser. No. 750,974, Jun. 28, 1985, abandoned, which is a continuation of Ser. No. 626,707, Jun. 29, 1984, abandoned, which is a continuation-in-part of Ser. No. 000,101, Oct. 31, 1983, abandoned. This application Oct. 1, 1986, Ser. No. 914,550

Claims priority, application Denmark, Oct. 29, 1982, 4800/82; Jul. 4, 1983, 3087/83

Int. Cl.[4] B01D *54/40;* G01N *27/46*

U.S. Cl. 204—1 T 11 Claims



1. A method for selectively determining the concentration or activity of a particular cation species in a medium also containing other cation species, said method comprising (a) contacting the medium with an ion-sensitive measuring electrode device comprising (i) an ion-sensitive solid element with selectivity to the particular cation and (ii) a reference system, and (b) determining the concentration or activity of the particular cation, the ion-sensitive element comprising ion-conductive crystalline material based on

(a) oxides of an alkali metal, zirconium, phosphorus, and optionally aluminum; or

(b) oxides of an alkali metal, zirconium, silicon, and optionally aluminum; or

(c) oxides of an alkali metal, zirconium, phosphorus, silicon, and optionally aluminum;

the crystal structure of which comprises a three-dimensional interstitial space comprising positions for the particular cation.

4,686,013

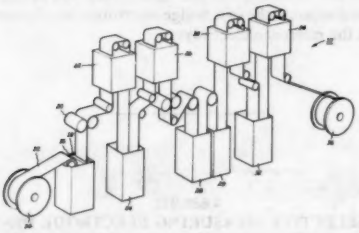
ELECTRODE FOR A RECHARGEABLE ELECTROCHEMICAL CELL AND METHOD AND APPARATUS FOR MAKING SAME

Saverio F. Pensabene; Jon K. West; Robert A. Leclair, all of Gainesville, Fla.; Carl F. Van Conant, Traverse City, Mich.; Arthur J. Catotti, Gainesville, and William L. Fralick, High Springs, both of Fla., assignors to Gates Energy Products, Inc., Denver, Colo.

Filed Mar. 14, 1986, Ser. No. 839,669

Int. Cl.[4] H01M *4/04*

U.S. Cl. 204—2.1 83 Claims



1. A process for manufacturing an electrode for a rechargeable electrochemical cell containing an electrolyte by electrodepositing a metal on the surface of a continous metallic strip, said process comprising the steps of:

providing an etchant tank containing an etchant for removing contaminants from said surface of said continuous metallic strip;

passing said continuous metallic strip while negatively polarized through said etchant tank prior to passing said metallic strip through a first electrolytic bath to remove said contaminants on said surfae of said metallic strip prior to said electrodeposition step;

providing a first tank containing an electrolytic bath containing ions of the metal to be deposited;

immersing in said first electrolytic bath a positively polarized electrode comprising the metal to be deposited on said metallic strip;

negatively polarizing said metallic strip;

passing said metallic strip while negatively polarized through said tank and through said first electrolytic bath to effect deposition of said metal on said metallic strip;

providing a second tank containing a second electrolytic bath;

immersing in said second electrolytic bath a second negatively polarized electrode;

positively polarizing said metallic strip containing said deposited metal after emergence from said first tank, and

passing said positively polarized metallic strip containing said deposited metal through said second electrolytic bath to effect oxidation of said deposited metal.

4,686,014

TURBULENT CELL ELECTROPLATING METHOD AND APPARATUS

Peter P. Pellegrino, 216 Edgewood La., Apple Valley, Minn. 55124, and Damian Pellegrino, 17029 Harbor Bluff Cir., Huntington Beach, Calif. 92649

Division of Ser. No. 674,426, Nov. 23, 1984. This application Feb. 21, 1986, Ser. No. 832,035

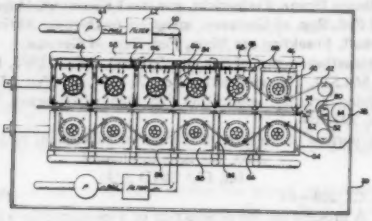
Int. Cl.[4] C25D *5/02*

U.S. Cl. 204—15 7 Claims

1. A method of plating the surface of a printed circuit board comprising the steps of

(a) emersing the printed circuit board in a plating solution in a tank;

(b) mechanically agitating the plating solution to provide substantial agitation to the plating solution adjacent the printed circuit board; and



(c) withdrawing plating solution from predetermined position adjacent the surface of the printed circuit board for return to the tank.

4,686,015

NICKEL/INDIUM ALLOY AND METHOD OF USING SAME IN THE MANUFACTURE OF PRINTED CIRCUIT BOARDS

George J. Samuels, Syracuse, and Joseph M. Garman, Williamsville, both of N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Division of Ser. No. 714,849, Mar. 26, 1985, Pat. No. 4,626,324, and a continuation-in-part of Ser. No. 805,352, Apr. 30, 1984, abandoned. This application Jun. 19, 1986, Ser. No. 876,148

Int. Cl.[4] C25D *5/02*

U.S. Cl. 204—15 19 Claims

1. In an improved method of preparing a printed circuit board from a metal clad substrate which comprises:

(a) covering at least one of the surfaces of the metal clad substrate with a coating of photoresist;

(b) masking the photoresist with a predetermined circuit design image;

(c) exposing the photoresist to a source of energy to provide a resist layer portion susceptible to a etchant over a desired circuit image on at least one of said surfaces, and a resist layer portion resistant to said etchant over the remainder of said surfaces;

(d) removing those portions of the photoresist which are susceptible to the etchant to provide the desired circuit image on at least one of said surfaces of the metal cladding;

(e) electroplating the desired circuit image with a metallic etch resist;

(f) removing the remaining portions of the photoresist from said board exposing a portion of the metal cladding; and

(g) removing the exposed metal cladding from the board to provide a board having metal circuit covered by a metallic etch resist, said improvement comprising a metallic etch resist composed of a nickel/indium alloy containing from about 0.1 to about 10 weight percent indium based on the total weight of the alloy.

4,686,016

METHOD OF THE ELECTRODEPOSITION OF A COATING ON AN ENDLESS BELT

Kurt Held, Alte Strasse 1, D-7218 Trossingen 2, Fed. Rep. of Germany

Division of Ser. No. 837,017, Mar. 6, 1986, Pat. No. 4,640,758. This application Aug. 12, 1986, Ser. No. 896,138

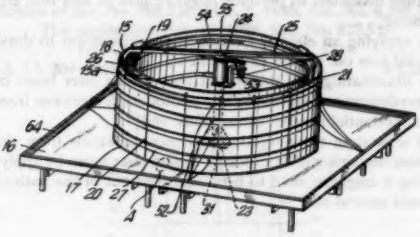
Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 3509388

Int. Cl.[4] C25D *5/00*

U.S. Cl. 204—25 8 Claims

1. Method of electrodepositing a metal layer on an endless belt where the belt has a circular form in the untensioned condition with an inwardly directed face surface and an out-

wardly directed face surface, comprising the steps of forming a bath containing an aqueous solution of electrolyte with at least one face surface of the endless belt exposed to the aqueous solution in the bath, arranging the at least one face surface of the endless belt extending generally vertically within the bath, connecting the endless belt as a cathode, providing an anode



extending into the bath in spaced relation to the at least one face surface of the endless belt whereby the aqueous electrolyte solution dissociates into ions with the ions containing metal atoms for deposition on the face surface of the endless belt exposed to the aqueous solution, and connecting the cathode and anode to the corresponding poles of a constant voltage source.

4,686,017

ELECTROLYTIC BATH AND METHODS OF USE

Donald C. Young, Fullerton, Calif., assignor to Union Oil Co. of California, Los Angeles, Calif.

Filed Jun. 28, 1985, Ser. No. 750,322

Int. Cl.[4] C25D *3/00*

U.S. Cl. 204—45.1 **27 Claims**

1. A method for electrolytically plating a metal on an electrically conductive substrate which method comprises suspending said electrically conductive substrate as a cathode in an electrolytic cell comprising an anode and said cathode immersed in an electrolytic bath comprising sulfuric acid and a chalcogen-containing compound soluble in said bath and having the empirical formula:

wherein X is a chalcogen, each of R_1 and R_2 is selected from hydrogen, NR_3R_4 and NR_5, at least one of R_1 and R_2 is other than hydrogen, each of R_3 and R_4 is selected from hydrogen and monovalent organic radicals, and R_5 is selected from divalent organic radicals, the molar ratio of said chalcogen-containing compound to said sulfuric acid is about 1 to less than 5, and the molar ratio of water to the combination of said sulfuric acid and said chalcogen-containing compound is about 10 or less, and electrolyticaly plating said metal on said substrate.

4,686,018

ORGANIC ELECTROLYSIS CELL WITH SACRIFICIAL ELECTRODE

Jacques Chaussard, Paris, France, assignor to Societe Nationale des Poudres et Explosifs, Paris, France

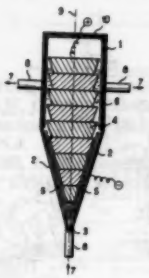
Filed Sep. 2, 1986, Ser. No. 904,025

Claims priority, application France, Sep. 5, 1985, 85 13188

Int. Cl.[4] C25C *1/00*

U.S. Cl. 204—59 R **16 Claims**

16. An electrolysis cell according to claim **13** fitted with a sacrificial electrode made of a metal chosen from the group consisting of magnesium, aluminum or zinc and their alloys for the electrosynthesis of ketones or aldehydes by the electro-



chemical reduction of organic halides in the presence of organic acid anhydrides.

4,686,019

DISSOLUTION OF PUO_2 OR NPO_2 USING ELECTROLYTICALLY REGENERATED REAGENTS

Jack L. Ryan, West Richland; Lane A. Bray, Richland, and Allyn L. Boldt, Kennewick, all of Wash., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 357,171, Mar. 11, 1982, abandoned. This application Sep. 26, 1984, Ser. No. 655,324

Int. Cl.[4] C25C *1/22, 3/34;* **G12C** *19/44, 19/46*

U.S. Cl. 204—1.5 **2 Claims**

1. A process of dissolving oxidatively an irradiated oxide reactor fuel containing plutonium dioxide, which comprises dissolving said fuel in hot nitric acid substantially free of hydrogen fluoride, thereby forming a dissolver solution and residual solids, transferring said solution and residual solids to the anode compartment of an electrolytic cell having a cathode compartment and an anode compartment separated by a diffusion barrier, and without adding a catalyst to said dissolver solution, impressing a potential across said cell, maintaining the temperature of said cell sufficiently high, with the potential sufficiently high to evolve gaseous oxygen from the anode, for a time sufficient to dissolve at least a substantial portion of said solids, while passing a non-reducing sweep gas through said anode compartment to remove ruthenium as gaseous RuO_4.

4,686,020

METHOD OF ELECTROCHEMICAL MACHINING BLADED ROTORS

Edmund R. Hinman, Monroe, Conn., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed Nov. 27, 1985, Ser. No. 802,142

Int. Cl.[4] B23H *9/10, 3/04, 7/28, 7/30*

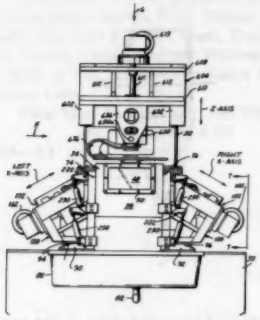
U.S. Cl. 204—129.1 **29 Claims**

1. A method for machining individual appendages disposed and spaced apart around a workpart, comprising:

(a) relatively moving the workpart and an electrolyte chamber in a direction to position an individual appendage to be machined at a workpart machining position in the electrolyte chamber and moving cathode means in the electrolyte chamber along a path resulting from movement in a combination of multiple other directions so as to position the cathode means in spaced machining relation to said individual appendage at the workpart machining position with an appendage adjacent said individual appendage received in pocket means in the cathode means without contact with the cathode means,

(b) relatively moving said individual appendage and cathode means toward one another with said adjacent appendage still received in said pocket means out of contact, and

(c) providing electrolyte between said individual appendage and cathode means as they move toward one another



while making said individual appendage an anode relative to the cathode means.

4,686,021

LITHOGRAPHIC SUPPORT AND PROCESS OF PREPARING THE SAME

Haruo Nakanishi; Hisao Ohba, and Hirokazu Sakaki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 2, 1985, Ser. No. 719,086

Claims priority, application Japan, Apr. 2, 1984, 59-065631; Apr. 2, 1984, 59-065632

Int. Cl.[4] C25F *3/04*

U.S. Cl. 204—129.75 **18 Claims**

1. A process of preparing a lithographic support which comprises chemically graining at least one surface of an aluminum plate with an aqueous solution containing chloride, fluoride or a mixture thereof wherein the fluoride is selected from the group consisting of, ammonium fluoride, sodium fluoride, silicon fluoride or fluoroboric acid, and wherein the chloride is selected form the group consisting of ferric chloride, ammonium chloride, calcium chloride, nickel chloride, sodium chloride and copper chloride and thereafter electrochemically graining said surface using alternating current in an acid electrolyte selected from hydrochloric acid, nitric acid, or a mixture thereof.

4,686,022

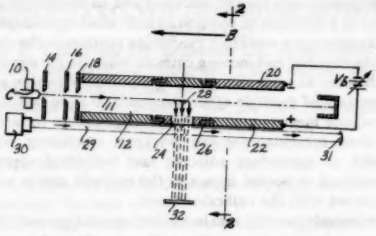
METHOD AND APPARATUS FOR PRODUCING A MONATOMIC BEAM OF GROUND-STATE ATOMS

Raymond D. Rempt, Woodinville, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 25, 1985, Ser. No. 779,826

Int. Cl.[4] B01J *19/12*; B01D *53/32*; H01J *49/20*

U.S. Cl. 204—157.41 **13 Claims**



1. A method of producing a beam of neutral atoms of a first element in which substantially all of the atoms are at the ground state, comprising the steps of:

(a) directing a beam of electrons of predetermined energy into a low-pressure environment containing molecules of a first type, said molecules containing said first element such that said molecules capture electrons from said beam and then dissociate to produce negative ions of said first element;

(b) applying an electric field to said environment to draw said ions out of said environment;

(c) illuminating said drawn out ions with a laser beam of predetermined wavelength to photodetach electrons from a substantial number of said ions; and

(d) separating the photodetached neutral atoms from the ions remaining after exposure to said laser beam by applying a magnetic field to bend said ions out of the path of said neutral ato

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4,686,023

SENSITIZED PHOTOCHEMICAL PREPARATION OF VITAMIN D

Richard D. S. Stevens, Toronto, Canada, assignor to Solarchem Research, Division of Brolor Investments, Ltd., Ontario, Canada

Filed Nov. 26, 1985, Ser. No. 801,853

Int. Cl.[4] C07C *1/72*; C07J *9/00*

U.S. Cl. 204—157.67 **11 Claims**

1. A process for achieving substantial photochemical conversion of tachysterol to previtamin D which comprises irradiating tachysterol in the presence of lumisterol, previtamin D and one of ergosterol and 7-dehydrocholesterol, in the substantial absence of free oxygen, with radiation having a signficant energy in the region 290–400 nm and in the presence of an effective amount of anthracene as photosensitizer, the wavelength of said irradiation being within the absorption spectrum of antracene and within the absorption spectra of tachysterol, lumisterol and the previtamin D, the anthracene concentration in the reactant mixture being sufficient to ensure that anthracene absorbs a substantial portion of the available, useful radiation.

4,686,024

NOVEL PERFLUORO CHEMICALS AND POLYFLUORINATED COMPOUNDS AND PROCESS FOR PRODUCTION OF THE SAME

Kirby V. Scherer, Jr., Santa Monica, Calif.; Taizo Ono, Kyoto, Japan; Kouichi Yamanouchi, and Kazumasa Yokoyama, both of Osaka, Japan, assignors to The Green Cross Corporation, Osaka, Japan

Filed Feb. 1, 1985, Ser. No. 697,552

Int. Cl.[4] C07C *41/00*

U.S. Cl. 204—157.95 **3 Claims**

1. A liquid phase fluorination method for substituting all of the hydrogen atom(s) contained in a partially fluorinated or non-fluorinated compound by fluorine wherein

(a) the fluorination is carried out at −75° to +100° C. in an inert liquid medium;

(b) the inert liquid medium is F-hexane or 1,1,2-trichloro-1,2,2-trifluoroethane or a mixture thereof;

(c) undiluted F_2 is used;

(d) the F_2 is maintained in stoichiometric excess at all times, so that the intermediate carbon radicals react with F_2 rather than each other;

(e) the compound to be fluorinated, diluterd with said inert liquid medium, is metered in slowly with vigorous stirring, so that it is rapidly diluted by the solvent and its concentration is kept low compared to F_2, and so that efficient heat dispersal occurs and

(f) UV illumination is used to initiate fluorination

(g) continuing said fluorination until substantial perfluorination has been completed.

4,686,025

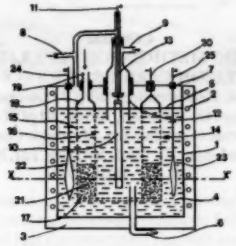
APPARATUS FOR THE PRODUCTION OF A METAL BY ELECTROLYZING HALIDES IN A MOLTEN SALT BATH, BY A SIMULTANEOUS CONTINUOUS DOUBLE DEPOSIT

Joseph Cohen, Paris, and Gérard Lorthioir, Vitry-Sur-Seine, both of France, assignors to Pechiney, Paris, France

Division of Ser. No. 708,520, Mar. 5, 1985, Pat. No. 4,588,485. This application Feb. 10, 1986, Ser. No. 827,535

Int. Cl.[4] C25C *3/26, 3/28, 3/32, 3/34*

U.S. Cl. 204—245 6 Claims



1. An electrolytic cell for electrolyzing halides, of a metal to be deposited, contained in a molten halide bath, said cell comprising a vat structured to contain the bath in a non-reactive atmosphere, an anodic system consisting of at least one cylindrical-shaped anode (**10**) plunging in the bath (**4**), a cathode (**14**) in the form of a metal lattice basket suspended in the bath and comprising two vertical coaxial cylinders comprising an exterior wall (**15**) and an interior wall (**16**) connected to a base (**17**), extending to the axis of the cell, a halide feed system (**19**) positioned at the upper part of the cathode, means (**9**) within the two cylinders for drawing off the released halogen by suction, means joining (**11**) and (**20**), the upper parts of the anodic system and the cathode respectively to the positive and negative poles of a source of direct current, wherein the anode is positioned at the center of the cell and is surrounded symmetrically by the basket, and wherein at least one complimentary cathode (**22**) is jointed at its upper part to a source of current with a more strongly negative potential than that of the basket, said at least one complimentary cathode being positioned in the compartment demarcated by the interior walls of the cell and the exterior wall of the basket in a symmetrical manner, and means for withdrawing said at least one complimentary cathode from the bath.

4,686,026

METHOD OF INSTALLATION OF MEMBRANE TO ELECTROLYTIC CELL

Yoshio Oda; Tatsuro Asawa; Kimihiko Sato, and Yasuo Sajima, all of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

Continuation of Ser. No. 279,752, Jul. 2, 1981, abandoned. This application Oct. 24, 1983, Ser. No. 543,805

Claims priority, application Japan, Jul. 11, 1980, 55-93866

Int. Cl.[4] C25B *13/00*

U.S. Cl. 204—252 10 Claims

1. A method of installing a shaped membrane in an electrolytic cell over an electrode wherein the material of the membrane consists of a fluorinated polymer containing active cation exchange groups of the formula: $—(COO)_mX$, wherein X is an alkali metal atom or —NHRR'R", wherein R, R' and R" independently represent hydrogen or lower alkyl and m is the valence of X, comprising:

installing said membrane in said cell as a fluorinated polymer containing carboxyl groups of the formula: —COOL, wherein L is hydrogen or C_1–C_{20} alkyl over said electrode; and converting the carboxyl groups of the formula: COOL of said membrane into carboxyl groups of the formula:$—(COO)_mX$ by passing an aqueous solution of an alkali metal hydroxide into a cathode compartment of said cell and passing an aqueous solution of an alkali chloride into an anode compartment of said cell.

4,686,027

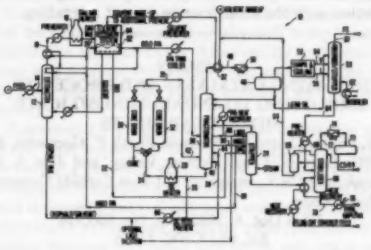
ASPHALT COKING METHOD

Jorge A. Bonilla, S.W. Calgary, Canada, and John D. Elliott, Randolph, N.J., assignors to Foster Wheeler USA Corporation, Livingston, N.J.

Filed Jul. 2, 1985, Ser. No. 751,048

Int. Cl.[4] C10G *9/14;* C10C *3/00, 3/08*

U.S. Cl. 208—39 12 Claims



1. A process for treating a heavy hydrocarbon fluid containing asphaltenes comprising:

contacting said heavy hydrocarbon fluid with a solvent, wherein the solvent is light naphtha, C_4 hydrocarbons, C_5 hydrocarbons, C_6 hydrocarbons, or a mixture of any of light naphtha and C_4, C_5 and C_6 hydrocarbons, to obtain an asphalt mix, containing asphalt and said solvent, and deasphalted oil mix, containing deasphalted oil and said solvent;

feeding said asphalt mix to a delayed coking process to form coke, wherein said asphalt mix is heated by passing said asphalt mix through conduit means in a heater in the delayed coking process, the flow of said asphalt mix through said conduit means being assisted by vaporization in said heater of the solvent in said asphalt mix, and said asphalt mix includes sufficient solvent to provide a residence time of said asphalt mix in said heater adequate for heating said asphalt mix for coking while reducing the formation of coke in said heater;

separating the solvent in the deasphalted oil mix from the deasphalted oil mix to yield deasphalted oil; and

recovering said deasphalted oil, bypassing said delayed coking process.

4,686,028

UPGRADING OF HIGH BOILING HYDROCARBONS

Roger P. Van Driesen, 17 Fabrow Dr., Titusville, N.J. 08560, and John R. Friday, 407 Shelbourne Ter., Ridgewood, N.J. 07450

Filed Apr. 5, 1985, Ser. No. 720,351

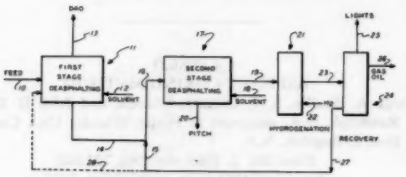
Int. Cl.[4] C10C *3/00, 3/08*

U.S. Cl. 208—86 14 Claims

1. A process for upgrading a high boiling hydrocarbon, comprising:

deasphalting the high boiling hydrocarbon to recover as separate fractions, deasphalted oil, resin and pitch; upgrading the resin fraction to produce an effluent containing upgraded product and high boiling components; recovering high boiling components from the effluent; subjecting said deasphalting at least a portion of the recovered high boiling components to reject coke precursors in

the (pitch fraction) high boiling components portion prior to recycle thereof to said upgrading with the resin fraction; and thereafter recyling the high boiling components portion with the resin fraction to said upgrading.



4,686,029

DEWAXING CATALYSTS AND PROCESSES EMPLOYING TITANOALUMINOSILICATE MOLECULAR SIEVES

Regis J. Pellet, Croton-On-Hudson; Frank P. Gortsema, Pleasantville; Gary N. Long, Putnam Valley, and Jule A. Rabo, Armonk, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Dec. 6, 1985, Ser. No. 805,714
Int. Cl.[4] C10G *47/16*
U.S. Cl. 208—111 **27 Claims**

1. The process for dewaxing a hydrocarbon feedstock comprising contacting the hydrocarbon feedstock with a dewaxing catalyst comprising at least one titanoaluminosilicate (TASO) characterized in its calcined form by an adsorption of isobutane of at least 2 percent by weight at a pressure of 500 torr and a temperature of 20° C. and further characterized in its calcined form by an adsorption of triethylamine of less than 5 percent by weight at a pressure of 2.6 torr and a temperature of 22° C., the amount of the TASO in the catalyst and the condition of the contacting being effective to cause dewaxing of the hydrocarbon feedstock.

4,686,030

MILD HYDROCRACKING WITH A CATALYST HAVING A NARROW PORE SIZE DISTRIBUTION

John W. Ward, Yorba Linda, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Filed Apr. 28, 1986, Ser. No. 856,817
Int. Cl.[4] C10G *45/08*
U.S. Cl. 208—216 PP **20 Claims**

11. A process for simultaneously hydrodesulfurizing, hydrodenitrogenating and mild hydrocracking a hydrocarbon feedstock comprising nitrogen components, sulfur components and feed components boiling above 700° F. comprising contacting said feedstock under conditions of elevated temperature and a hydrogen partial pressure less than about 1,500 p.s.i.g. with a particulate catalyst comprising at least one nickel active metal hydrogenation component, at least one molybdenum active metal hydrogenation component and at least one phosphorus component on a support comprising an amorphous porous refractory oxide, said catalyst having a pore size distribution wherein the mode pore diameter is in the range from about 55 to about 100 angstroms and at least about 75 percent of the pore volume is in pores of diameter in the range from about 50 angstroms to about 130 angstroms and from about 20 angstroms above the mode pore diameter to about 20 angstroms below said mode pore diameter and less than 10 perecent of said pore volume is in pores of diameter greater than 110 angstroms, said conditions are such that said sulfur components and said nitrogen components in said feedstock are converted to product components of reduced sulfur and nitrogen content and between about 10 and 50 volume percent of the feed components boiling above 700° F. are simultaneously converted to product components boiling at or below 700° F.

4,686,031

BENEFICIATION OF GALLIUM IN FLY ASH

Bohdan Lisowyj, and David C. Hitchcock, both of Omaha, Nebr., assignors to InterNorth, Inc., Omaha, Nebr.

Filed Dec. 27, 1985, Ser. No. 813,968
Int. Cl.[4] B07B *4/08*
U.S. Cl. 209—2 **2 Claims**

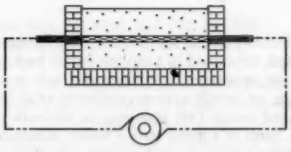
1. A method for the beneficiation of gallium and other valuable trace elements from fly ash, which comprises subjecting the ash to particle size classification while avoiding substanial rupturing of cenospheres and plerospheres in the ash and isolating thereby up to 30 percent of the finest ash particles.

4,686,032

AUTOMATIC METHOD FOR SEPARATING AND CLEANING SILICON CARBIDE FURNACE MATERIALS

Robert J. Seider, Ransomville; Philip J. Guichelaar, Williamsville, and Robert O. Anderson, Akron, all of N.Y., assignors to Electro Minerals (Canada), Inc., Toronto, Canada

Filed Apr. 10, 1985, Ser. No. 721,761
Int. Cl.[4] B03C *1/00*
U.S. Cl. 209—8 **12 Claims**



1. A method of separating silicon carbide furnace materials containing non-porous high grade silicon carbide particles and various lower grades of porous silicon carbide particles, comprising the following steps:

(a) Mixing the silicon carbide furnace materials with a magnetic powder wherein the lower grades of porous silicon carbide particles become impregnated with the magnetic powder while the non-porous high-grade silicon carbide particles do not become impregnated with the magnetic powder; and

(b) Magnetically separating the mixed silicon carbide furnace materials into a magnetic powder impregnated porous group of lower-grade silicon carbide particles and a non-impregnated, non-pourous group of high-grade silicon particles.

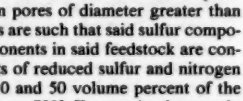
4,686,033

TRITHIOCARBONATES AS FLOTATION REAGENTS

Clarence R. Bresson; Robert M. Parlman, and James B. Kimble, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 592,990, Mar. 23, 1984, which is a division of Ser. No. 328,340, Dec. 7, 1981, Pat. No. 4,459,237. This application Nov. 27, 1985, Ser. No. 802,283
Int. Cl.[4] B03D *1/14*; C07C *154/00*
U.S. Cl. 209—167 **16 Claims**

1. A process for recovering metals from an ore or from a metallurgical concentrate which process comprises the step of contacting a froth-floated concentrate with one or more compounds of the general formula



(I)

wherein X is selected from a —OH, —COOH, and —COOY; R is a C_{1-20} hydrocarbylene moiety; and Y is a Group IA metal ion, a Group IIA metal ion, or an ammonium ion.

4,686,034

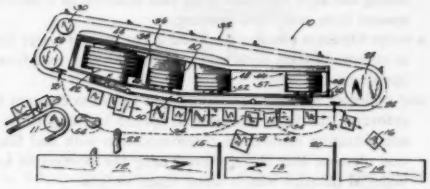
MAGNETIC REFUSE SEPARATOR

William T. Barrett, Waukesha, Wis., assignor to Wehr Corporation, Milwaukee, Wis.

Continuation of Ser. No. 732,907, May 9, 1985, abandoned, which is a continuation of Ser. No. 578,138, Feb. 8, 1984, abandoned, which is a continuation of Ser. No. 326,586, Dec. 2, 1981, abandoned. This application Sep. 5, 1986, Ser. No. 904,774

Int. Cl.[4] B03C 1/22; B07C 9/00

U.S. Cl. 209—223.1 18 Claims



1. A solid waste magnetic separator having a material transport belt, means for generating a magnetic field, and means for supporting said belt for movement through said magnetic field, said magnetic field generating means being characterized in that it comprises:

at least two magnetic assemblies having adjacent magnetic field generating portions of the same magnetic polarity located above and near a portion of said belt and aligned relative to each other in the direction of belt travel so that said belt and any magnetic materials attracted thereto pass sequentially through the magnetic fields generated by said magnetic assemblies, said assemblies including an upstream assembly an a downstream assembly, and

ferromagnetic pole shoe means disposed between said belt and said magnetic assemblies and extending over the magnetic field generating portion of said magnetic assemblies so that said pole shoe means does not have a magnetic orientation of its own but assumes that induced in it by the magnetic assemblies and so that the combined magnetic field generated by said magnetic assemblies is relatively uniform along said belt and magnetic materials attracted to said belt remain attracted to said belt as it travels through said combined field, said pole shoe means having an upstream end terminating beneath said upstream assembly and a downstream end terminating beneath said downstream assembly.

4,686,035

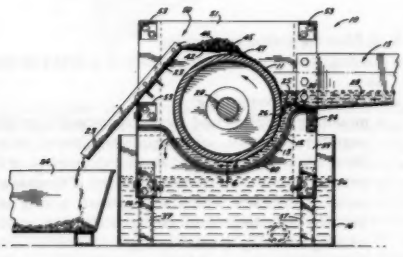
CYLINDRICAL DRUM MAGNETIC SEPARATOR

Mark R. Estabrook, Rockford, Ill., assignor to Barnes Drill Co., Rockford, Ill.

Filed Jul. 24, 1985, Ser. No. 758,653

Int. Cl.[4] B03C 1/12

U.S. Cl. 210—137 9 Claims



1. Apparatus for cleaning dirty liquid containing magnetic particles, said apparatus comprising a generally cylindrical drum mounted to rotate about a generally horizontal axis and having a magnetic outer peripheral surface, means cooperating with said drum to define path for dirty liquid to pass around and beneath the drum for collection of the magnetic particles on the outer surface of the drum, said flow path having an entry end at one side of said drum, and means for delivering a supply of dirty liquid to the entry end of said flow path, the improvement in said apparatus comprising, an elongated weir located at the entry end of said flow path, said weir extending generally horizontally alongside the outer periphery of the drum and extending generally radially of the drum, said weir being submerged in the supply of dirty liquid and coacting with the drum to define a gap permitting liquid from said supply to pass between said weir and said drum, and means mounting said weir for downward and upward swinging relative to said drum about a pivot axis extending parallel to said axis of the drum, the pivot axis of the weir being located so as to enable the weir to swing downwardly and upwardly to increase and decrease the width of said gap when the pressure of the dirty liquid in said supply increases and decreases, respectively.

7. Apparatus for cleaning dirty liquid containing magnetic particles, said apparatus cmprising a generally cylindrical drum having a generally horizontally extending axis and having a magnetic outer surface, a pair of upper upright side plates located at opposite ends of said drum and supporting said drum to rotate about its own axis, an apron underlying said drum and extending between said upper side plates, said apron having a concave and substantially arcuate upper surface located outwardly of said substantially concentric with the outer surface of the drum and coacting with the drum and the upper side plates to define a flow path for liquid beneath the drum, a pair of lower upright side plates located at opposite ends of said drum and positioned below said apron, said apron having one end sandwiched between one upper side plate and the adjacent lower side plate and having an opposite end sandwiched between the other upper and lower side plates, gasket means sealing the ends of said apron between said upper and lower side plates, and means detachably but rigidly fastening said upper and lower side plates and said apron together as a unit.

4,686,036

DEVICE FOR OZONIZING A FLUID

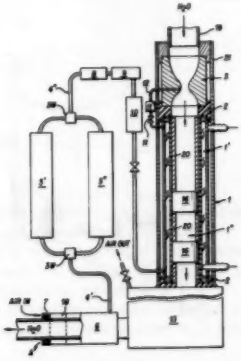
Barbara Laederach-Zaugg, Kranichweg 30, CH-3074 Muri, Switzerland

Continuation-in-part of Ser. No. 706,851, Jan. 31, 1985, abandoned. This application Feb. 12, 1986, Ser. No. 828,695

Claims priority, application PCT Int'l Appl., Jun. 15, 1984, PCT/CH84/00097

Int. Cl.[4] C02F 1/78

U.S. Cl. 210—177 4 Claims



1. A device for ozonizing a fluid comprising a venturi-tube

(3), an ozonizer (1), a connecting channel (12), a phase separating element (13) and heat exchanger (6) and in which device the fluid flows downwardly through the venturi-tube (3), then downwardly through the ozonizer (1), exits therefrom into and through the separating element (13) and then through and out of heat exchanger (6); said venturi-tube (3) being arranged and disposed above and before said ozonizer (1) in the downward direction of flow of the fluid, said ozonizer (1) comprising a first region (1') and a second region (1'') of concentrically arranged and disposed tubes, said ozonizer (1) and venturi-tube (3) defining by their described arrangement and disposition a common cylindrical housing, said first region (1') having electrical discharge means to produce ozone bearing gas from oxygen bearing gas, said second region (1'') being centrally disposed relative to the longitudinal axis of said common cylindrical housing and being the flow channel for the flow relative to its longitudinal axis of the fluid therethrough, said venturi-tube (3) having a narrowest part, said venturi-tube (3) being directly connected to the upper end of said first region (1') and closing said upper end, said venturi-tube (3) communicating with said second region (1''), said connecting channel (12) having an inlet side and an outlet side, said inlet side of said connecting channel (12) being in communicating relationship with said first region (1') and said outlet side of said connecting channel (12) being in communicating relationship with said narrowest part of said venturi-tube (3) to thereby establish communication between said first region (1') and said narrowest part of said venturi-tube (3) with flow of said ozone bearing gas from said first region (1') to said narrowest part of said venturi-tube (3), said venturi-tube (3) dispersing and mixing said ozone bearing gas in said fluid for flow downwardly through said flow channel of said second region (1''), said second region (1'') having a lower end from which the mixed fluid and ozone bearing gas exits, said lower end of said second region (1'') and said phase separating element (13) being in communicating relationship, said phase separating element (13) separating said fluid from the mixture, said oxygen bearing gas entering said heat exchanger (6), said heat exchanger (6) and separating element (13) being in communicating relationship, said fluid separated by said separating element (13) flowing to and through said heat exchanger (6) to cool same and thereby to cool the oxygen bearing gas entering the heat exchanger (6) and to condense water out of such oxygen bearing gas.

4,686,037

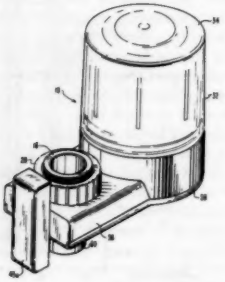
WATER FILTER APPARATUS

Kenneth Lang, Loveland, Colo., assignor to Teledyne Industries, Inc., Fort Collins, Colo.

Filed Mar. 27, 1985, Ser. No. 716,811

Int. Cl.[4] B01D *35/02*

U.S. Cl. 210—221.2 **22 Claims**



1. A water filter cartridge which comprises:

a shell that confines a filtration material; said filtration material through which water flows, said shell having opposite first and second end walls;

a conduit disposed through said material from a first opening in one of said end walls to a second opening in the other of said end walls;

a third opening in one of said end walls spaced from one of said first and second openings and communicating in flow of water with said material;

a fourth opening in the other of said end walls spaced from the other of said first and second openings and communicating the flow of water with said material at a location spaced from said third opening;

a water filtration element disposed in the path of water flow in communication with said material through said fourth opening;

and deflector means surrounding said filtration element for enforcing the flow of water to spread laterally through said filtration material in communication with said filtration element and thereby increasing the portion of said material through which water tends to flow.

4,686,038

FILTER APPARATUS

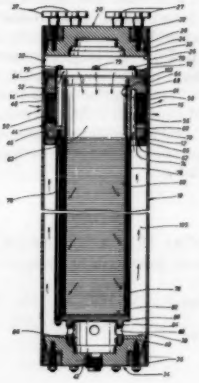
Johnny Arnaud, Houston, Tex., assignor to Hydrotreat, Inc., Houston, Tex.

Continuation of Ser. No. 626,474, Jul. 2, 1984, Pat. No. 4,565,628, which is a continuation of Ser. No. 491,712, May 5, 1983, abandoned, which is a continuation-in-part of Ser. No. 428,345, Sep. 29, 1982, abandoned. This application Jul. 16, 1985, Ser. No. 755,561

The portion of the term of this patent subsequent to Jan. 21, 2003, has been disclaimed.

Int. Cl.[4] B01D *35/30*

U.S. Cl. 210—232 **4 Claims**



1. A filter apparatus, comprising:

a housing, said housing being sealed at a first end thereof; and

a filter element, comprising;

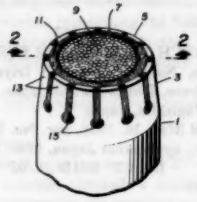
a mounting member, said mounting member including a peripheral groove, said peripheral groove extending from a first surface of said mounting member, at least a portion of said groove being tapered, a flexible sealing member disposed within said groove, a ring at least partially insertable into said groove, and means for causing said ring to enter said groove and to cause said sealing member to wedge against the inner surface of said housing and for enabling said ring to seal over a range of longitudinal positions within said housing.

4,686,039

FLUID SEPARATION MODULE

Roger S. Otstot, Raleigh, N.C., and Duane E. King, St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Dec. 26, 1985, Ser. No. 813,753
Int. Cl.[4] B01D *13/01*
U.S. Cl. 210—321.1 8 Claims



1. A fluid separation module, comprising:

a. a cylindrical shell, said shell having in one end thereof a plurality of spaced cuts extending longitudinally from the end of the shell to points spaced from said end of said shell, said cuts dividing the end of the shell into a plurality of tabs;

b. a tube sheet positioned in said end of said shell, said tube sheet being made from a curable polymeric material;

c. a bundle of hollow fiber membranes positioned in the shell and extending through the tube sheet, said shell having sufficient flexibility that the tabs adhere to the tube sheet and flex inwardly as the polymeric material of the tube sheet is cured; and

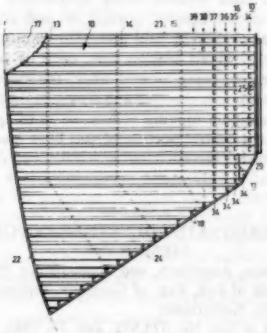
d. said cylindrical shell is provided with a plurality of spaced holes, said cuts terminating at said holes.

4,686,040

DISC FILTER ELEMENT FOR A ROTATABLE DISC FILTER

Bjarne Nilsson, Nygatan 18C,, S-462 00 Vänersborg, Sweden

Filed Feb. 19, 1986, Ser. No. 830,793
Claims priority, application Sweden, Feb. 20, 1985, 8500826
Int. Cl.[4] B01D *33/26*
U.S. Cl. 210—331 7 Claims



1. In a rotatable disc filter, a disc filter element, filter means (17) through which filtrate is suctioned, said filter means being spaced from a fluid-tight filter element body (11, 12) having a plurality of openings (34–39) connecting a space between said filter means (17) and said filter element body (11, 12) with the interior of said filter element body, said interior communicating with a connection means (29) for connecting said disc filter element to vacuum and to discharge filtrate therefor, the improvement comprising a number of said openings (34–39) in said filter element body (11, 12) determined as a function of the flow capacity through said filter means (17) in a given filtering task, said number of openings so determined being so positioned that, at the lowest flow capacity, all openings (34) are positioned adjacent said connection means (29), and at increasing flow capacity, further openings (35, 36, . . . 39) are positioned at increasing distances therefrom, and means for shutting off a portion of the interior of said filter element body located beyond the most distant opening, as seen from said connection means (29), from the remainder of the interior of said filter element body so as to prevent filtrate from entering said portion, said remainder being in communication with said connection means (29).

5. A method comprising adapting a rotatable disc filter to a given filtering task, said filter being of the type in which filtrate is suctioned through a filter means (17) spaced from a fluid-tight filter element body (11, 12), said filter element body (11, 12) being provided with a plurality of openings (34–39) connecting a space between said filter means (17) and said filter element body (11, 12) with the interior of the latter, said interior communicating with a means (29) for connecting said disc filter element to vacuum to discharge filtrate therefrom by,

(a) determining the number of said openings (34–39) in said filter element body (11, 12) as a function of the flow capacity through said filter means (17) in said given filtering task;

(b) positioning said openings of said number of openings so determined so that at the lowest flow capacity, all openings (34) are positioned adjacent said connection means (29) and at increasing flow capacity, further openings (35, 36, . . . 39) are positioned at increasing distances therefrom;

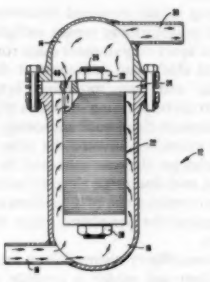
(c) shutting off a portion of said interior of said filter element body located beyond the most distant opening, as seen from said connection means (29), from the remainder of said interior of said filter element body so as to prevent filtrate from entering said portion.

4,686,041

MOLECULAR DIFFERENTIATION FILTER

Teunis T. Van den Berg, 1171 Pinion Ave., P.O. Box 2470, Big Bear, Calif. 92314, and Thomas D. Eastlack, 5639 Klusman, Alta Loma, Calif. 91701

Continuation-in-part of Ser. No. 674,969, Nov. 26, 1984, abandoned. This application Oct. 9, 1985, Ser. No. 785,872
Int. Cl.[4] B01D *29/46*
U.S. Cl. 210—335 16 Claims



1. A molecular differentiation filter for filtering particles in the sub-mil range, comprising

a body having two chambers, a first chamber and a second chamber, said first and second chambers being defined by a chamber dividing member;

an inlet that is in communication with said second chamber;

an outlet that is in communication with said first chamber; and

a plurality of coaxial, stacked discs mounted onto said chamber dividing member, said plurality of discs resides en-

tirely in said second chamber, wherein said discs comprise alternating filtering discs and separation discs, and further wherein

each of said filtering discs is a generally smooth-surfaced disc that has a filtering perimetrical edge, a plurality of substantially identical filtrate holes spaced inwardly from said perimetrical edge, and a plurality of spokes each of which is positioned between two of said filtrate holes; and

each of said separation discs is a generally smooth-surfaced disc that has a plurality of substantially identical, radially-extending separation tips, and a thickness, wherein alternating ones of said separation tips are juxtaposed with said filtering disc spokes and remaining ones of said separation tips are juxtaposed with said filtering disc filtrate holes such that each of said remaining separation tips bridges one of said filtrate holes;

whereby said thickness of said separation disc positioned coaxially between two adjacent said filtering discs defines a filtering spacing in said sub-mil range.

4,686,042

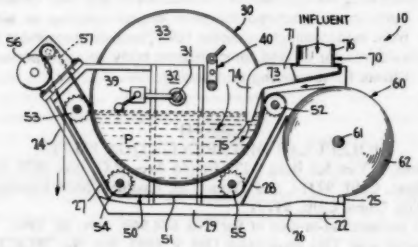
GRAVITY LIQUID FILTRATION APPARATUS WITH ROTATABLE DISCS THAT MOUNT SWINGING DISCHARGE ELEMENTS THEREBETWEEN

Fred H. Eckardt, Franklin, Tenn., assignor to EMCO Filtration Systems, Inc., Franklin, Tenn.

Filed Mar. 7, 1986, Ser. No. 837,293

Int. Cl.[4] B01D *33/04, 35/22*

U.S. Cl. 210—386 **4 Claims**



1. A gravity liquid filtration apparatus which comrpises

a frame means having opposite side walls and providing an open bottom,

a pool-forming means mounted between said opposite side walls, said pool-forming means including a central shaft, two spaced apart containment discs rotatably mounted on said central shaft, said containment discs having peripheral edges, and two mounting brackets respectively mounted to corresponding locations on facing sides of said two containment discs, each mounting bracket including a swing pin extending toward the other containment disc, and a discharge element mounted on and between said swing pins, said discharge element including a contact rod which can contact a run of an endless carrier belt which is pressed against the peripheral edges of said two containment discs,

a filter medium supply means which includes an elongated filter medium and which is capable of discharging said elongated filter medium therefrom,

a filter medium carrier means for supporting said elongated filter medium and for pressing it against the peripheral edges of said two containment discs along corresponding bottom arcs thereof, said filter medium carrier means comprising an endless wire belt and a plurality of rollers which support said endless wire belt such that a run thereof is pressed towards said peripheral edges of said containment discs,

a drive means for driving said filter medium carrier means, and

a liquid input means, said liquid input means including a delivery head having a nozzle portion which extends between and radially inwardly of the peripheries of said two containment discs, said nozzle portion having an elongated mouth which is aimed downwardly so as to discharge liquid to be filtered onto a downwardly sloped portion of the filter medium supported on said filter medium carrier means.

4,686,043

BATCH TYPE FILTER SYSTEM

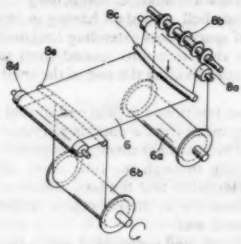
Koichi Yagishita, Nagoya; Yasunori Iriyama, Iwakura, and Mitsumasa Hirose, Ohgaki, all of Japan, assignors to Kabushiki Kaisha Yagishita, Japan

Filed Mar. 26, 1986, Ser. No. 844,197

Claims priority, application Japan, Mar. 27, 1985, 60-60774

Int. Cl.[4] B01D *29/02*

U.S. Cl. 210—387 **2 Claims**



1. In a batch type filter system adapted for movement of a sheet-like long filter medium therethrough including a cover provided with a supply pipe for supplying raw liquid and air, a plate having a filter medium support on an upper surface thereof and a filtrate exhaust pipe, said cover being vertically separable from said plate, a plurality of filter medium moving rollers provided on both the upstream and downstream sides of said cover and said plate, and a sheet-like long filter medium stretched over said rollers and adapted to be moved a predetermined length in the downstream direction per one batch of filtration, said filter medium being temporarily fixedly held between the circumferential portion of said cover and the circumferential portion of said plate; the improvement comprises arcuately curved tension bars, each of said arcuately curved tension bars being located where the moving direction of said filter medium is changed and downstream of at least one of said filter medium moving rollers, so as to apply a larger tensile force to a central portion of said filter medium than to both edge portions thereof.

4,686,044

POLYCARBONATE-POLYETHER-COPOLYMER MEMBRANE

Joachim Behnke, Amorbach, and Hans-Jürgen Pitowski, Miltenberg, both of Fed. Rep. of Germany, assignors to AKZO NV, Arnhem, Netherlands

Continuation of Ser. No. 573,552, Jan. 25, 1984, abandoned, which is a continuation of Ser. No. 399,983, Jul. 19, 1982, abandoned, which is a continuation of Ser. No. 177,462, Jul. 11, 1980, abandoned. This application Dec. 9, 1985, Ser. No. 807,766

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1979, 2932761

Int. Cl.[4] B01D *39/00;* **D02G** *3/00*

U.S. Cl. 210—500.22 **12 Claims**

7. An isotropic polycarbonate-polyether block copolymer membrane useful for hemodialysis, containing less than 0.5 weight percent impurities consisting essentially of

(1) about 5 to 35 weight percent of repeating polyethylene-ether-carbonate units, the polyethylene oxide blocks of

said copolymer having a molecular weight of from 1000 to 20,000, and

(2) about 95 to 65 weight percent of repeating bisphenol A - carbonate units wherein the intrinsic viscosity of said copolymer ranges from about 180 to 300 ml/g as measured in chloroform at 25° C., and

The ultrafiltration rate of said membrane amounts to about 4 to 200 ml/h.m^2 mmHg, said membrane being prepared by a wet extrusion process comprising the following steps:

(a) dissolving said polycarbonate - polyether block copolymer in a solvent therefor at a temperature of from about 80°–120° C.,

(b) increasing the temperature of said solution to about 140°–180° C.,

(c) filtering said solution,

(d) cooling said filtered solution to about 20°–50° C.,

(e) extruding said solution through a nozzle into a bath containing a non-solvent for the copolymer for precipitating the polymer, and

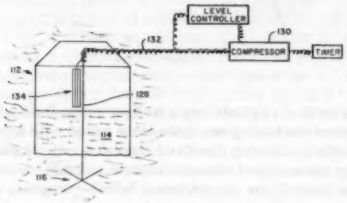
(f) drying the extruded precipitated polymer in the presence of measures for preventing longitudinal and cross-sectional shrinkage.

4,686,045

AERATION OF CESSPOOLS

George B. McKee, 472 Bay Ave., Patchogue, N.Y. 11772

Filed Jun. 23, 1986, Ser. No. 877,145
Int. Cl.[4] C02F 3/06
U.S. Cl. 210—620 12 Claims



1. A system for aerating a cesspool for reestablishing drainage comprising a cesspool open at the bottom and resting on a bed of material for drainage of liquid out of cesspool down through the open bottom thereof and through said bed of material, aeration means located under said cesspool embedded completely within said bed of material for bubbling air under pressure up through said bed and into said cesspool through said bottom thereof, and compressor means for delivering air under pressure to said aeration means for reestablishing drainage through said cesspool and said bed of material.

8. A method of aerating a cesspool which is open at the bottom and rests on a bed of material so that during normal operation of said cesspool liquid waste collected therein drains down through settled waste material and said bed of material, comprising the steps of placing an aerating device under said cesspool completely embedded within said body of material, and supplying air under pressure to said device to diffuse said air under pressure up through said bed of material and said settled waste material into said cesspool through said bottome thereby maintaining drainage downwardly of liquid waste in said cesspool.

4,686,046

PROCESS FOR SEPARATING CYCLIC OLIGOMERIC DIHYDRIC PHENOL CARBONATE FROM AROMATIC POLYCARBONATE

Robert A. Pyles, Evansville, and Patrick J. Mulvey, Mt. Vernon, both of Ind., assignors to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 23, 1985, Ser. No. 812,448
Int. Cl.[4] B01D 13/00
U.S. Cl. 210—651 1 Claim

1. A process for separating cyclic oligomeric dihydric phenol carbonate from aromatic polycarbonate polymer which comprises contacting a solution comprising a major amount of aromatic polycarbonate and a minor amount of cyclic oligomer dihydric phenol carbonate with a semi-permeable membrane, and recovering a second solution which has passed through the said membrane, said second solution enriched in cyclic oligomer dihydric phenol carbonate.

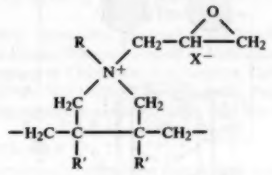
4,686,047

PROCESS FOR DETACKIFICATION OF PAINT SPRAY OPERATION WASTES

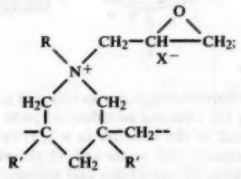
Joseph B. Arots, Wilmington, Del., assignor to Calgon Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 779,399, Sep. 24, 1985, abandoned. This application Dec. 16, 1985, Ser. No. 809,693
Int. Cl.[4] C02F 1/56
U.S. Cl. 210—712 8 Claims

1. In a process comprising: (a) detackifying over-sprayed paints, lacquers or enamels entrained in water circulated in a water wash paint spray operation and (b) separating detackified, over-sprayed paints, lacquers or enamels from said water, the improvement comprising adding to the water being circulated, for the purpose of detackifying said over-sprayed paints, lacquers or enamels, an effective amount of a water-soluble resinous reaction product of a polymer of n-alkyldiallylamine hydrohalide and epihalohydrin having the following structure:



or



wherein R is C_16 alkyl, R′ is hydrogen or a lower alkyl group and X is halide; wherein the number average molecular weight of said resinous reaction product ranges from 2,000 to 500,000, and wherein the pH of said water is maintained at at least about 6.

4,686,048

PROCESS FOR TREATING CAT CRACKER BOTTOMS SLUDGE

George A. Atherton, Baton Rouge, La.; Ghazi B. Dickakian, Greenville, S.C., and Edward D. Gra. Jr., Baton Rouge, La., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Filed Dec. 23, 1981, Ser. No. 333,989
Int. Cl.[4] B01D *11/02*
U.S. Cl. 210—771 16 Claims

1. A process for treating cat cracker bottoms sludge to remove the cat cracker bottoms hydrocarbons from the catalyst fines in the sludge which comprises:

mixing the cat cracker bottoms sludge with a liquid hydrocarbon diluent selected from the group consisting of heptane, benzene and toluene which have azeotropic boiling points with water of 150° F. to 210° F.;

separating the fines from the diluent-sludge mixture by filtration and washing the fines with additional diluent in an amount of 20% to 500% by weight of said hydrocarbons in said sludge;

mixing the separated fines and remaining diluent with water in an amount of 250% to 700% by weight of said separated fines and diluent remaining in said fines said mixing being conducted at a temperature below the boiling point of the diluent and within the range of ambient of 210° F.; and

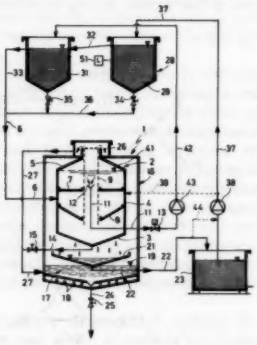
removing the remaining diluent by distillation of the fines, diluent and water to obtain the treated fines which have a hydrocarbon content of less than 5% by weight.

4,686,049

METHOD AND APPARATUS FOR REPROCESSING AQUEOUS, OILY AND GREASY CLEANING SOLUTIONS

Heinz Klobenzer, Filderstadt, and Peter Hösel, Pforzheim, both of Fed. Rep. of Germany, assignors to Dürr GmbH, Fed. Rep. of Germany

Filed Mar. 24, 1986, Ser. No. 843,128
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1985, 3512207
Int. Cl.[4] B01D *3/02*
U.S. Cl. 210—774 8 Claims



1. Method of reprocessing aqueous, oily and greasy cleaning solutions during the cleaning of industrial parts by separating oil and grease out of the solution in a gravity oil separator comprising superposed dirt, water and oil phases, said method comprising the steps of vaporizing said solution,

heating said oil separator with hot water vapor produced by said vaporizing, for the purpose of thickening, the separated mixture of oil, grease and cleaning solution,

eliminating waste water by feeding the condensed water resulting from said vaporizing back to the cleaning solution for the purpose of its regeneration.

4,686,050

FABRIC RINSING LIQUID AND FABRIC TREATING METHOD

Charles Howerin, 817 NE. 29th Dr., Wilton Manors, Fla. 33334

Continuation-in-part of Ser. No. 691,860, Jan. 16, 1985, abandoned. This application Sep. 22, 1986, Ser. No. 909,609
Int. Cl.[4] D06M *11/15*; B05D *3/02*
U.S. Cl. 252—8.8 2 Claims

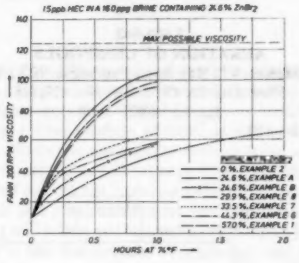
1. A fabric rinsing liquid in the form of an aqueous mixture of disodium edetate and a liquid cationic polymer made by quaternizing with methyl chloride the reaction product of dimethyl amine and epichlorohydrin, said mixture containing substantially 3.76×10^{-4}% to 3.7% disodium edetate and 2.5% to 10% of said cationic polymer, by weight, and the balance water.

4,686,051

METHOD OF INCREASING THE RATE OF HYDRATION OF ACTIVATED HYDROXYETHYL CELLULOSE COMPOSITIONS

Roy F. House, Houston, and Lonnie D. Hoover, Chappell Hill, both of Tex., assignors to NL Industries, Inc., New York, N.Y.

Division of Ser. No. 262,026, May 8, 1981, Pat. No. 4,476,032. This application Aug. 6, 1984, Ser. No. 637,971
The portion of the term of this patent subsequent to Dec. 13, 2000, has been disclaimed.
Int. Cl.[4] C09K *3/00, 7/02*
U.S. Cl. 252—8.551 6 Claims


15ppb HEC IN A 16.0ppg BRINE CONTAINING 24.6% ZnBr2
MAX POSSIBLE VISCOSITY
FANN 300 RPM VISCOSITY
HOURS AT 76°F
0 % EXAMPLE 2
24.6 % EXAMPLE A
24.6 % EXAMPLE B
29.9 % EXAMPLE 8
33.5 % EXAMPLE 7
44.3 % EXAMPLE 6
57.0 % EXAMPLE 1

1. In a method of producing a well servicing fluid wherein a first solution containing zinc bromide is mixed with at least one second solution having dissolved therein a salt selected from the group consisting of calcium chloride, calcium bromide, and mixtures thereof, the improvement which comprises the following steps in the order indicated:

(a) admixing a hydroxyethyl cellulose composition with said second solution to produce a viscosified solution and

(b) thereafter admixing said viscosified solution with said first solution containing zinc bromide and having a density of at least 17.0 ppg to give the desired well servicing fluid having a density in the range from about 14.2 ppg to about 18.0 ppg, said hydroxyethyl cellulose being activated prior to admixture so as to substantially hydrate or solubilize in said second solution at ambient temperatures.

4,686,052

STABILIZED FRACTURE FLUID AND CROSSLINKER THEREFOR

Sandra E. Baranet, Broken Arrow; Richard M. Hodge, Sand Springs, and Clare H. Kucera, Broken Arrow, all of Okla., assignors to Dowell Schlumberger Incorporated, Tulsa, Okla.

Filed Jul. 8, 1985, Ser. No. 753,214
Int. Cl.[4] E21B *43/26*
U.S. Cl. 252—8.551 17 Claims

1. A composition adapted to crosslink a solvatable polysaccharide in an aqueous media at a basic pH, said composition comprising an aqueous solution of (a) a crosslinking amount of

an organometallic compound of zirconium in a +4 valence state and (b) a stabilizing amount of an alkanolamine corresponding to the formula

$$R—N—(CH_2—CH(OH)—R')_2$$

wherein

R is H or $CH_2—CH(OH)—R'$ and

R' is H, $—CH_3$ or $—C_2H_5$,

the molar ratio of said alkanolamine to said zirconium crosslinker being at least about 15.

4,686,053

MICELLAR SYSTEMS CONTAINING N-ACYL N-ALKYL α-AMINO-CARBOXYLIC COMPOUNDS, PARTICULARLY USEFUL IN ENHANCED HYDROCARBON RECOVERY

Marc Baviere, Noisy Le Roi, and Bruno Durif Varambon, Vienne, both of France, assignors to Institut Francais du Petrole, Rueil-Malmaison, France

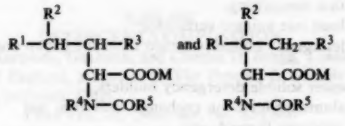
Filed Apr. 22, 1985, Ser. No. 725,729

Claims priority, application France, Apr. 20, 1984, 84 06279

Int. Cl.⁴ E21B *43/22*

U.S. Cl. 252—8.554 **9 Claims**

1. In a microemulsion comprising water, at least one hydrocarbon liquid and at least one surface-active compound, the improvement wherein said at least one surface-active compound is selected from N-acyl N-alkyl α-amino carboxylic compounds complying with the general formulas:



(I) (II)

wherein at least one of the symbols R^1, R^2 and R^3 represents a saturated or unsaturated aliphatic hydrocarbon radical having from 1 to 22 carbon atoms, one of R^1, R^2 or R^3 optionally comprising a carboxylic group COOM, the one or more remaining symbols representing a hydrogen atom, R^1, R^2 and R^3 containing together from 10 to 22 carbon atoms, R^4 is methyl, R^5 is methyl and M is an alkali or alkaline-earth metal, ammonium or a quaternary ammonium group, and wherein the water contains alkali metal cations selected from the group consisting of Na^+ and K^+ and/or alkaline earth cations selected from the group consisting of Ca^{2+} and Mg^{2+}, ammonium in amounts such that the total salt content ranges from 30 to 300 g/l, and wherein said microemulsion contains at least one alcohol cosolvent or cosurfactant.

4,686,054

SUCCINIMIDE LUBRICATING OIL DISPERSANT

Max J. Wisotsky, Highland Park; Ricardo Bloch; Darrell W. Brownawell, both of Scotch Plains; Frank J. Chen, Piscataway, and Antonio Gutierrez, Mercerville, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 645,828, Aug. 31, 1984, which is a continuation of Ser. No. 543,269, Oct. 19, 1983, abandoned, which is a continuation of Ser. No. 293,146, Aug. 17, 1981, abandoned. This application Jun. 24, 1986, Ser. No. 878,033

Int. Cl.⁴ C10M *137/06, 133/44*

U.S. Cl. 252—32.7 E **12 Claims**

1. A lubricating oil composition exhibiting improved dispersancy in both gasoline and diesel engines comprising a major amount of lubricating oil and 0.5 to 10 weight percent of a dispersant, said dispersant being prepared in a sequential process comprising the steps of:

(a) in a first step reacting an oil-soluble polyolefin succinic anhydride, the olefin being a C_3 or C_4 olefin and an alkylene polyamine of the formula $H_2N(CH_2)_n(NH(CH_2)_n)_mNH_2$ wherein n is 2 or 3 and m is 0 to 10, in a molar ratio of about 1.0 to 2.2 moles of polyolefin succinic anhydride per mole of polyamine, and

(b) reacting the product of step (a) with dicarboxylic acid anhydride selected from the group consisting of maleic anhydride and succinic anhydride in sufficient molar proportions to provide a total mole ratio of about 2,3 to 3.0 moles of anhydride compounds per mole of polyamine.

4,686,055

REACTION PRODUCTS OF DIALKYLENETRIAMINES AND LUBRICANT COMPOSITIONS CONTAINING SAME

Andrew G. Horodysky, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 729,708, May 2, 1985, Pat. No. 4,581,037, which is a division of Ser. No. 541,814, Oct. 13, 1983, Pat. No. 4,551,257. This application Mar. 20, 1986, Ser. No. 841,652

The portion of the term of this patent subsequent to Nov. 12, 2002, has been disclaimed.

Int. Cl.⁴ C10M *137/10*

U.S. Cl. 252—32.7 E **10 Claims**

1. The reaction product obtained by reacting at a temperature between about 80° C. and about 120° C. for a period between about 2 and about 24 hours a triamine and an acid of the formula:

$$R^3COOH$$

wherein R^3 is a C_1 to C_4 hydrocarbyl group in a molar ratio of triamine to acid between about 1:1 and about 1:2 respectively.

4,686,056

METAL-BORON DERIVATIVES AS LUBRICANT ADDITIVES

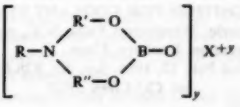
Peter Jessup, Santa Ana; Richard A. Holstedt, Whittier, and Kenneth Baron, Diamond Bar, all of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 158,828, Jun. 12, 1980, Pat. No. 4,400,284. This application Apr. 7, 1983, Ser. No. 482,941

Int. Cl.⁴ C10M *139/00*

U.S. Cl. 252—49.7 **26 Claims**

1. A lubricating composition comprising a major amount of a lubricating oil and a minor amount of a compound of the formula:



wherein R is hydrogen or an alkyl, aryl, alkylaryl or arylalkyl radical having from 1 to about 24 carbon atoms, R' and R'' are straight or branched carbon chains, aryl, alkylaryl or arylalkyl radicals having from about 2 to about 20 carbon atoms, y is an integer of 1 to 4, and X is a metal selected from a transition metal having an atomic number between 21 and 30 or a Group IVA metal or a mixture thereof.

4,686,057

PASTY DAMPING MEDIUM METHOD FOR PREPARING AND USING SAME

Kaspar Lochner, Munich; Helmut Schürmann, Dachau, and Erich Brand, Munich, all of Fed. Rep. of Germany, assignors to Aros Hydraulik GmbH, Memmingen, Fed. Rep. of Germany

PCT No. PCT/EP82/00043, § 371 Date Nov. 3, 1982, § 102(e) Date Nov. 3, 1982, PCT Pub. No. WO82/03086, PCT Pub. Date Sep. 16, 1982

PCT Filed Mar. 3, 1982, Ser. No. 441,513

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1981, 3107996

The portion of the term of this patent subsequent to Nov. 22, 2000, has been disclaimed.

Int. Cl.[4] C04B *43/00;* C10M *125/18*

U.S. Cl. 252—62 9 Claims

1. A pasty medium for damping mechanical and/or acoustic vibrations, comprising a silicone oil having a viscosity of 100 to 2,000 mm^2/s at 25° C. and about 20 to 80% by weight based on the total weight of the damping medium of particles of at least one inorganic compound, at least 80% of said particles having a particle size of less than 10 μm and said inorganic compound being selected from the group consisting of aluminum phosphate, calcium phosphate, calcium fluoride, and zinc sulfide.

4,686,058

THICKENED-WATER BASED HYDRAULIC FLUIDS

Ellen S. Schwartz, Warren; Pauls Davis, Gibraltar, both of Mich., and Jerrold F. Maxwell, Matteson, Ill., assignors to BASF Corporation, Wyandotte, Mich.

Division of Ser. No. 253,716, Apr. 13, 1981, abandoned. This application Aug. 18, 1983, Ser. No. 524,245

Int. Cl.[4] C10M *173/00*

U.S. Cl. 252—75 10 Claims

1. A hydraulic fluid composition comprising water; an organic thickener which is a polyether polyol having a molecular weight of about 100 to about 40,000 prepared by reacting ethylene oxide or ethylene oxide and at least one lower alkylene oxide having 3 to 4 carbon atoms with at least one active hydrogen-containing compound and at least one alpha-olefin oxide or glycidyl ether having a carbon chain of about 10 to about 22 aliphatic carbon atoms wherein said alpha-olefin oxide or glycidyl ether is present in the amount of 1 to about 20 percent by weight based upon the total weight of said thickener; and a polyoxyalkylene polymer or copolymer having at least 50 percent by weight oxypropylene groups and an average molecular weight of about 75 to about 5000.

4,686,059

ANTIMONY TARTRATE CORROSION INHIBITIVE COMPOSITION FOR COOLANT SYSTEMS

Norman E. Payerle, Wappingers Falls, N.Y., assignor to First Brands Corporation, Danbury, Conn.

Filed Feb. 12, 1986, Ser. No. 828,657

Int. Cl.[4] C09K *5/00*

U.S. Cl. 252—75 31 Claims

12. An automobile coolant concentrate comprising (a) a liquid polyhydric alcohol chosen from the group consisting of ethylene glycol, propylene glycol, diethylene glycol and mixtures thereof, and (b) corrosion inhibitors in a corrosion inhibitory amount with respect to corrosion of lead-containing solders, the corrosion inhibitors comprising (i) an alkali metal antimony tartrate, and (ii) an azole compound.

4,686,060

DETERGENT COMPOSITION PROVIDING RINSE CYCLE SUDS CONTROL CONTAINING A SOAP, A QUATERNARY AMMONIUM SALT AND A SILICONE

Paul J. Crabtree, Cincinnati, Ohio, and Kazuhiko Imakawa, Takarazuka, Japan, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 23, 1986, Ser. No. 821,669

The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.

Int. Cl.[4] B01D *19/04;* C11D *9/36*

U.S. Cl. 252—90 5 Claims

1. A granular detergent composition providing reduced sudsing during rinsing following a washing operation, said composition comprising:

(a) at least one surfactant;

(b) at least one detergency builder; and

(c) a plurality of rinse cycle suds control prills comprising:

(i) fatty acid soap;

(ii) at least one quaternary ammonium salt; and

(iii) at least one silicone fluid suds suppressor;

wherein said prills comprise from about 0.1% to about 14% by weight said silicone fluid, wherein said prills comprise from about 5% to about 55% by weight said soap, wherein the mole ratio of said soap to said quaternary ammonium salt in said prills is from about 0.1:1to about 4:1, and wherein said composition comprises from about 1% to about 20% by weight of said prills.

5. A granular detergent composition providing reduced sudsing during rinsing following a washing operation, said composition comprising:

(a) at least one anionic surfactant;

(b) a detergency builder selected from the group consisting of:

(i) water soluble detergency builders;

(ii) aluminosilicate ion exchange materials; and

(iii) mixtures thereof; and

(c) a plurality of rinse cycle suds controls prills comprising:

(i) fatty acid soap selected from the group consisting of:

((a)) coconut soap;

((b)) tallow soap; and

((c)) mixtures thereof;

(ii) trimethyltallowammonium chloride; and

(iii) at least one polydimethylsiloxane silicone fluid suds suppressor;

wherein said prills comprise from about 2% to about 8% by weight said polydimethylsiloxane and from about 15% to about 30% by weight said soap, wherein the mole ratio of said soap to said chloride in said prills is from about 1:1 to 2:1, and wherein said detergent composition comprises from about 5% to about 50% by weight said surfactant and from about 5% to about 94% by weight said builder and from about 1% to about 20% by weight said prills.

4,686,061

P-SULPHOPHENYL CARBONATES AND DETERGENT COMPOSITIONS AND DETERGENT ADDITIVES CONTAINING THESE COMPOUNDS

Andreas J. H. Nollet, Hilversum; John Meijer, Deventer, and Johannes W. A. Overkamp, Raalte, all of Netherlands, assignors to Akzo NV, Arnhem, Netherlands

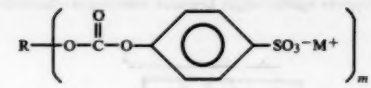
Filed Jul. 3, 1986, Ser. No. 881,960

Claims priority, application Netherlands, Jul. 3, 1985, 8501902

Int. Cl.[4] C07C *69/96;* C11D *3/34, 3/395;* D06L *3/02*

U.S. Cl. 252—95 4 Claims

1. A compound of the general structural formula:



where R represents an organic group, M^+ a cation and m a natural number, characterized in that m has a value not higher than 2, where when m=1, R corresponds to the general formula:

$$R'(-O-CH_2-CH_2-)_n$$

where R' represents an alkyl group containing 1–8 carbon atoms and n has a value of 2–3, and when m=2, R represents an alkylene group containing 2–14 carbon atoms or corresponds to the general formula:

$$-CH_2-CH_2(-O-CH_2-CH_2-)_pO-CH_2-CH_2-$$

where p has a value in the range of 0 to 10.

4. A solid detergent composition containing a surfactant, a bleaching activator, and a bleaching agent which generates hydrogen peroxide under alkaline conditions, characterized in that the bleaching activator is a compound according to claim 1.

4,686,062

DETERGENT COMPOSITION

Nigel J. Kermode, Gosforth, and Charles D. Bragg, Tynemouth, both of England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 20, 1986, Ser. No. 831,380

Claims priority, application United Kingdom, Feb. 23, 1985, 8504733

Int. Cl.[4] C11D *7/18, 17/00*

U.S. Cl. 252—99 **13 Claims**

1. A granular detergent composition having a phosphorus content of less than 5% comprising:

(a) from about 5% to about 50% by weight of a water-insoluble aluminosilicate cation exchange material, and

(b) from about 0.1% to about 20% by weight of a polycarboxylate polymer comprising on a monomer weight basis

(i) from about 5% to about 70% of a C_3–C_{10} monoolefinic monocarboxylic acid,

(ii) from about 5% to about 70% of a C_4–C_6 monoolefinic dicarboxylic acid, and

(iii) from about 1% to about 80% of nonionic spacer which is an ester selected from C_1–C_6 alkyl and hydroxyalkyl esters of C_3–C_{10} monoolefinic monocarboxylic acids, C_4–C_6 monoolefinic dicarboxylic acids and C_2–C_6 monoolefinic alcohols, or an alcohol selected from C_2–C_6 monoolefinic alcohols.

4,686,063

FATTY PEROXYACIDS OR SALTS THEREOF HAVING AMIDE MOIETIES IN THE FATTY CHAIN AND LOW LEVELS OF EXOTHERM CONTROL AGENTS

Michael E. Burns, West Chester, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Sep. 12, 1986, Ser. No. 907,207

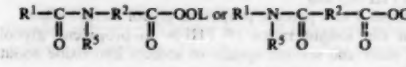
The portion of the term of this patent subsequent to Jan. 6, 2004, has been disclaimed.

Int. Cl.[4] C11D *7/54*

U.S. Cl. 252—102 **19 Claims**

1. A bleaching composition comprising a mixture of:

(1) a peroxyacid compound of the following general formulas:



wherein R^1 and R^2 are alkyl(ene), aryl(ene) or alkaryl(ene) groups containing from about 1 to about 14 carbon atoms; R^5 is H or an alkyl, aryl, or alkaryl group containing from about 1 to about 10 carbon atoms; and L is either H or $Mg^{2+}X_{2-n}.YH_2O$ wherein X is a compatible anion, n is one or two, and Y is from O to about 6; and

(2) an exotherm control agent selected from the group consisting of boric acid, urea, and mixtures thereof at a weight ratio of exotherm control agent to peroxyacid compound of more than about 0.2:1 for the boric acid and more than about 0.5:1 for the urea.

4,686,064

COMPOSITION FOR THE DESULPHATIZING CLEANING OF CARBONATIC STONE SURFACES

Giuseppe Pizzigoni, Busto Arsizio, and Paolo Parrini, Novara, both of Italy, assignors to Larac S.p.A., Varese, Italy

Filed Jan. 24, 1986, Ser. No. 822,104

Claims priority, application Italy, Jan. 25, 1985, 19239 A/85

Int. Cl.[4] C11D *7/12*

U.S. Cl. 252—153 **6 Claims**

1. A composition for the desulphatizing cleaning of stone surfaces having a prevailingly carbonatic composition or of layers of such nature on different materials, which composition comprises a mixture of a material of anion exchange with an aqueous solution of ammonium carbonate.

4,686,065

CAUSTIC BASED CLEANING COMPOSITION CONTAINING THFA AND A PROPOXYLATED ALCOHOL OR PHENOL

Kenneth E. Bliznik, Dolton, and Gilles M. L. Verboom, Decatur, both of Ill., assignors to Miles Laboratories, Inc., Elkhart, Ind.

Filed May 23, 1986, Ser. No. 866,306

Int. Cl.[4] C11D *7/06, 7/26, 7/50, 7/52*

U.S. Cl. 252—159 **9 Claims**

1. A composition for removing cooking deposits from surfaces soiled with such deposits which comprises on a weight/-weight basis as a percentage of the entire composition:

(a) from 7 to 10 percent of an alkali metal hydroxide;

(b) a solvent system for the alkali metal hydroxide which comprises:

i. from 2 to 20 percent of tetrahydrofurfuryl alcohol, and

ii. from 1 to 10 percent of one or more propoxylated alcohols or phenols of the formula:

$$R-O-CH_2CH(CH_3)O-_nH$$

wherein R is phenyl or a straight chain alkyl of 1 to 4 carbon atoms and n is 1–3 in which the weight ratio of tetrahydrofurfuryl alcohol to propoxylated alcohol is about 2:1,

(c) an alkali compatible thickener which when present in adequate quantity, will cause the composition to have a resting viscosity of from about 1,000 to about 5,000 centipoise at room temperature,

said composition being further defined in that the weight ratio of alkali metal hydroxide to the solvent system is about 1:2, and

(d) the balance is water.

7. A caustic based cleaning composition for removing baked on soil from oven surfaces which comprises on a weight/-weight basis as a percentage of the entire composition:

(a) from 7 to 10 percent of sodium hydroxide;

(b) from 8 to 20 percent of a solvent system for the alkali metal hydroxide which comprises:

i. from 10 to 16 percent of tetrahydrofurfuryl alcohol (THFA,) and

ii. from 5 to 8 percent propylene glycol methyl ether

wherein the weight ratios of THFA to propylene glycol methyl ether and solvent system to sodium hydroxide about 2:1, and

(c) a sodium hydroxide compatible thickener in sufficient amount to cause the composition to have a resting viscosity of from about 1,000 to 5,000 centipoise at room temperature.

4,686,066

METHOD FOR THE SEPARATION OF OIL-IN-WATER EMULSIONS

Manfred Hofinger; Martin Hille, and Roland Böhm, all of Hoechst Aktiengesellschaft, P.O. Box 80 03 20, D-6230 Frankfurt am Main 80, Fed. Rep. of Germany

Filed Dec. 18, 1985, Ser. No. 810,661

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1984, 3446489

Int. Cl.[4] B01D *17/04*

U.S. Cl. 252—344 **3 Claims**

1. Method for the separation of oil-in-water emulsions by addition of cationic polymers, wherein an effective amount of a hompolymer of diallyldimethylammonium chloride, which contains in addition 5 to 10% by weight of diallyldimethylammonium chloride monomer and has a viscosity of 15,000 to 45,000 mPa s measured in a 38% by weight solution in water at 25° C., is added to the emulsion.

4,686,067

PROCESS FOR ELIMINATING DEPOSITS FORMED IN A STEAM GENERATOR OF A PRESSURIZED WATER NUCLEAR REACTOR

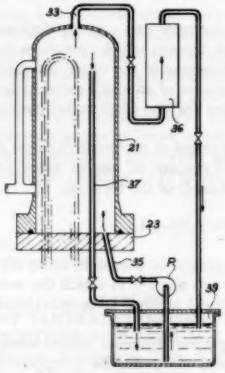
Jean-Paul Veysset, Esbly; Jean-Jacques Camp, and Didier Noel, both of Avon, all of France, assignors to Electricite de France Service National, Paris, France

Filed Dec. 28, 1984, Ser. No. 687,264

Claims priority, application France, Apr. 5, 1984, 84 05377

Int. Cl.[4] G21F *9/00;* **G21C** *19/32*

U.S. Cl. 252—626 **6 Claims**



1. A process for the elimination of corrosion products formed on the tube plate and in the gaps between tubes and spacer plates of a steam generator of a pressurized water nuclear reactor, in order to avoid the appearance of a corrosion phenomenon which can lead to necking or denting of tubes through oxide growth, comprising reacting with said oxides at a temperature between 50° and 100° C., an aqueous washing solution containing 6 to 8% gluconic acid, 3 to 5% citric acid, approximately 0.5% corrosion inhibitor and ammonia until a pH between approximately 3 and 9.5 is obtained and the potential of the solution is regulated to approximately 200 m V/SEC.

4,686,068

METHOD OF BATCHWISE TREATING RADIOACTIVE ORGANIC WASTES

Toyoyasu Saida, Fujisawa; Takahisa Sunagawa, Narita; Tsuneo Yamakawa, Mobara; Norima Ohta, and Keishi Obara, both of Chiba, all of Japan, assignors to Toyo Engineering Corporation, Funabashi, Japan

Filed Jul. 9, 1985, Ser. No. 753,196

Claims priority, application Japan, Jul. 10, 1984, 59-142833

Int. Cl.[4] G21F *9/14;* **F23G** *5/12*

U.S. Cl. 252—632 **8 Claims**

1. A method of batchwise treating radioactive organic waste which is apt to melt and fuse to form large lumps, which comprises: introducing a first batch of radioactive organic waste into a bath of an aqueous reaction medium in a reactor, said reaction medium containing, as a fusion-preventing agent effective to prevent fusion of said radioactive waste, particles of one or more solid substances selected from the group consisting of silicon dioxide and the carbonates, hydroxides and oxides of calcium, barium, iron and zinc, the amount of said fusion-preventing agent being from 1.0 to 7.0% by weight, based on the weight of the radioactive organic waste to be treated, said reaction medium also containing a catalyst effective to catalyze oxidative decomposition of said radioactive organic waste;

closing the reactor and heating the contents thereof until the internal temperature of the reactor is from 180° to 250° C.;

supplying an oxygen-containing gas to the reactor so as to establish, in the reactor, an oxygen partial pressure of from 3 to 25 kg/cm^2, and oxidatively decomposing the radioactive organic waste in the reactor, at a temperature of from 180° to 250° C., while maintaining the pH of the aqueous reaction medium in the range of from higher than 0.01 to less than 8;

discharging gaseous effluents from the reactor which effluents are composed mainly of carbon dioxide, steam and non-condensable gases; and after said first batch of radioactive waste has been oxidatively decomposed, then supplying a second batch of radioactive organic waste and fusion-preventing agent to the aqueous reaction medium remaining in the reactor and repeating the oxidative decomposition under the same conditions as described above.

4,686,069

AIR HUMIDIFIER

Ernst A. Hahne, Allschwil, and Hermann Künzig, Weil am Rhein, both of Fed. Rep. of Germany, assignors to Eltex-Elektrostatik Gesellschaft mbH, Weil am Rhein, Fed. Rep. of Germany

Filed Jun. 17, 1986, Ser. No. 875,264

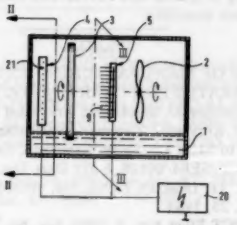
Claims priority, application Fed. Rep. of Germany, Jun. 26, 1985, 3522882

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—92 **15 Claims**

1. Air humidifier apparatus comprising: an air permeable plate unit; means for moistening said plate unit; blower means

forcing air through said unit for humidifying the air; and electrostatically-negatively charged high-voltage electrodes positioned in the air stream both upstream of and downstream of said unit.



4,686,070

METHOD OF PRODUCING ALUMINUM OXYNITRIDE HAVING IMPROVED OPTICAL CHARACTERISTICS

Edward A. Maguire, Ashland, Mass.; Thomas M. Hartnett, Nashua, N.H., and Richard L. Gentilman, Acton, Mass., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 570,420, Jan. 13, 1984, Pat. No. 4,481,300, which is a continuation of Ser. No. 297,897, Aug. 31, 1981, abandoned. This application Oct. 29, 1984, Ser. No. 665,463

Int. Cl.[4] C04B *35/58*

U.S. Cl. 264—1.2 **21 Claims**

1. A method of preparing homogeneous aluminum oxynitride comprising the steps of:

introducing aluminum oxide powder and carbon black into a reaction chamber with the carbon black content being in the range of 5.4 to 7.1 weight percent;

providing nitrogen in said chamber; and

heating said chamber at a temperature in the range of about 1550° to 2140° C. to react said powders and gas to produce a reacted powder substantially comprising aluminum oxynitride.

4,686,071

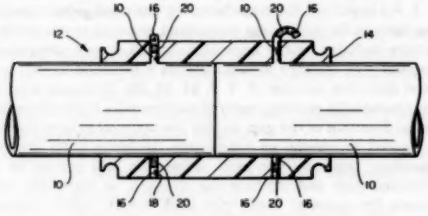
TEMPERATURE INDICATION ASSEMBLY FOR USE WITH HEAT-RECOVERABLE ARTICLES

Nachum Rosenzweig, Palo Alto, and Ken W. Skanderup, Belmont, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Jul. 25, 1984, Ser. No. 634,242

Int. Cl.[4] H05B *3/08*

U.S. Cl. 264—27 **15 Claims**



1. A method of repairing, reinforcing, joining or otherwise modifying a substrate, which method comprises

(1) placing adjacent the substrate an assembly comprising:

(a) a heat-recoverable article which can be connected to a power supply to cause current to pass through the article and to cause the article to heat and recover, and

(b) a plug which is in a recess in said recoverable article and comprises a first polymer, the plug being relatively opaque at room temperature and relatively transparent at an elevated temperature; and

(2) passing current through the article at least until the plug becomes relatively transparent;

thereby indicating that the parts of the recoverable article defining the recess have reached said elevated temperature.

4,686,072

PROCESS FOR PREPARING A CARBONACEOUS FIVE-LAYER FUEL CELL ELECTRODE SUBSTRATE WITH ELONGATED HOLES FOR FEEDING REACTANT GASES

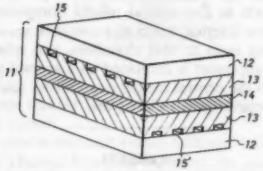
Hiroyuki Fukuda; Masatomo Shigeta; Hisatsugu Kaji, all of Iwaki, and Kuniyuki Saitoh, Abiko, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 718,382, Apr. 1, 1985, Pat. No. 4,567,086. This application Oct. 4, 1985, Ser. No. 784,547

Claims priority, application Japan, Apr. 4, 1984, 59-68059

Int. Cl.[4] H01M *4/96*

U.S. Cl. 264—29.5 **24 Claims**



1. A process for forming an electrode substrate for fuel cells comprising the steps of:

(1) supplying in order, to a mold having a predetermined configuration:

(a) a material for a first porous carbonaceous layer,

(b) a material for forming first elongated holes,

(c) a material for a first dense carbonaceous layer having a bulk density greater than a bulk density of the first porous layer,

(d) a material for a separator,

(e) a material for a second dense carbonaceous layer,

(f) a material for forming second elongated holes perpendicular to the first elongated holes, and

(g) a material for a second porous carbonaceous layer having a bulk density less than a bulk density of the second dense layer;

(2) press molding the materials in the mold;

(3) post-curing the press-molded material; and

(4) calcinating the post-cured material in an inert atmosphere.

4,686,073

DEVICE FOR CASTING ELECTRIC COMPONENTS

Franz Koller, Neuried, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 16, 1986, Ser. No. 886,588

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1985, 3526303

Int. Cl.[4] B29C *33/12*

U.S. Cl. 264—102 **4 Claims**

1. A device for casting electrical components of a type in which an electrical part is mounted to a terminal carrier plate, comprising:

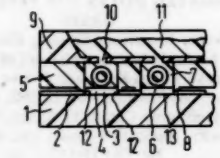
a flat lower mould component;

a layer of silicon rubber located on the lower mould component and containing a plurality of recesses for receiving and closely fitting with a terminal carrier plate;

a central mould component having a like plurality of chambers each shaped to receive a corresponding electrical part, the chambers extending through the central mould component between upper and lower ports in upper and

lower surfaces respectively and the central mould component having a like plurality of ridges on the lower surface, each ridge surrounding a corresponding one of the lower ports; and

an upper mould component with a hollow interior, the upper mould component having a lower surface with a like plurality of openings therein, the openings communicating with said interior and being arranged in a manner that



when the upper mould component is in a first position, all of the openings are aligned with corresponding ones of the upper ports in the central mould component, whereby said hollow interior serves as a common sprue for supplying casting resin to said chambers, and when the upper mould component is displaced to a second position with respect to the central mould component, said upper ports and said openings are closed off.

4,686,074

ALTERNATE HIGH-MOLECULE ARRANGEMENT PRODUCTION PROCESS

Miyoshi Okamoto, Takatsuki, Japan, assignor to Toray Industries, Inc., Tokyo, Japan

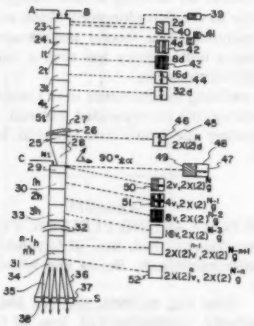
PCT No. PCT/JP84/00080, § 371 Date Oct. 31, 1984, § 102(e) Date Oct. 31, 1984, PCT Pub. No. WO84/03470, PCT Pub. Date Sep. 13, 1984

PCT Filed Mar. 2, 1984, Ser. No. 668,879

Claims priority, application Japan, Mar. 3, 1983, 58-34906; Mar. 28, 1983, 58-50441

Int. Cl.[4] B29C *47/06*

U.S. Cl. 264—171 **14 Claims**



1. A multi-core composite fiber or film continuous production process comprising the steps of making a primary multilayer structure of at least two immiscible fluids comprising a multiplicity of alternately arranged layers having interfaces extending substantially in a common direction, said common direction extending along the longitudinal flow direction of said primary multi-layer structure, separating portions of said layers along a direction extending at an angle to said running direction, and making a secondary multi-layer structure by interposing another polymer fluid layer between said separated portions, thereby cutting the interfaces of the polymers of the primary multi-layer structure into a number of parts by the insertion of said interposed fluid, thereby forming interfaces extending at an angle to said interfaces between said primary fluids and along said common direction, thereby forming at least one component of the primary multi-layer structure into a multiplicity of spaced-apart cores, and discharging the resulting multi-core structure.

4,686,075

METHOD OF MANUFACTURING EXTRUDED PIPES AND APPARATUS FOR CARRYING OUT THE METHOD

André Dziewanowski, Stockholm; Krzysztof Piotrowski, Sollentuna, and Krzysztof Zaremba, Vallentuna, all of Sweden, assignors to Mats Lundberg, Sundsvall, Sweden

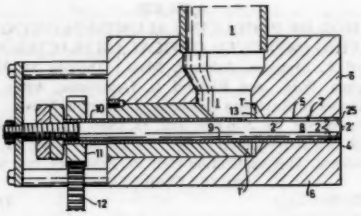
PCT No. PCT/SE84/00128, § 371 Date Dec. 11, 1984, § 102(e) Date Dec. 11, 1984, PCT Pub. No. WO84/04070, PCT Pub. Date Oct. 25, 1984

PCT Filed Apr. 9, 1984, Ser. No. 681,849

Claims priority, application Sweden, Apr. 12, 1983, 8302033

Int. Cl.[4] B29C *47/24*

U.S. Cl. 264—209.2 **13 Claims**



1. A method of manufacturing extruded pipes where plasticized material is advanced to an extrusion nozzle comprising a circular gap, the material being transported axially in said gap while material is caused to be rotationally moved in the circumferential direction of the gap so that the material at least partially is caused to assume an orientation deviating from the axial direction, whereby non-axial orientation will prevail in the extruded pipe and increase the strength, the material being supplied to a forming space at the outer end of the extrusion nozzle by means of at least one outlet for material which material moves continuously, by rotating or oscillating in circumferential direction of the gap characterized in that the material is caused to move in the circumferential direction of the gap (**2**) at least adjacent the inner (**7**) and outer (**5**) defining walls of the gap (**2**) by means of at least one rotary tubular body (**9, 14, 15, 20, 21**) comprising at least one longitudinal slit (**13, 17, 18, 22, 23**) extending between a feed-in space (**1'**), for the material, and said forming space (**2'**) located at the outer end (**4**) of the extruding nozzle, in which slit said material is fed in and from which slit material is discharged to the forming space (**2'**).

2. An apparatus for manufacturing extruded pipes, comprising devices for advancing plasticized material to an extrusion nozzle included in the apparatus, which nozzle comprises a circular gap, through which material is intended to pass in an axial direction, devices (**5, 7, 9, 14, 15, 20, 21**) being provided for rotationally moving material substantially in the circumferential direction of the gap, so that the material at least partially is caused to assume an orientation deviating from the axial direction, whereby non-axial orientation will prevail in the extruded pipe and increase the strength, at least one outlet means for material being provided, which outlet means is located and is adapted for continuously or oscillating rotatable movement in the circumferential direction of the gap, and from which outlet means the material is intended to be supplied to a forming space located at the outer end of the extrusion nozzle, characterized in that at least one tubular body (**9, 14, 15, 20, 21**) is rotatably disposed in said gap (**2**), which tubular body is intended for moving material in the circumferential direction of the gap, said material being intended to be moved in said circumferential direction at least adjacent the inner and outer walls of the gap (**2**), said tubular bodies (**9, 14, 15, 20, 21**) comprising at least one longitudinal slit (**13, 17, 18, 22, 23**)

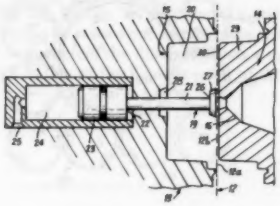
extending between a feed-in space (1') for the material and said forming space (2') located at the outer end (4) of the extrusion nozzle.

4,686,076

METHOD, MACHINE AND MOLD FOR FABRICATING CONTAINERS, MADE FROM AN INJECTED MATERIAL, WITH A FILM FORMING AN EXTERNAL COATING

Pierre Dromigny, 54 avenue de Versailles, 75016 Paris, France, and Théodore Schöttli, Formenbau, CH 8253 Diessenhofen, Switzerland

Filed Jun. 24, 1986, Ser. No. 877,756
Int. Cl.[4] B29C *31/08, 33/14*
U.S. Cl. 264—268 9 Claims



1. In a method for fabricating, by injection of synthetic material, containers having a film forming an external at least partial coating and forming an integral part of the containers, by means of an injection machine including, more particularly, a mold formed of a male punch element and a female die element and at least one nozzle for injecting synthetic material, said method including the following steps:

feeding the mold with films precut to the desired format;

holding the film applied against the male element during closure of the mold; and

injecting synthetic material in the space left between the male and female elements when said mold is closed, wherein during closure of the mold, the film is held against the male element, at least partially by a constant bearing force applied against the face of the film opposite said female element by a slider housed in the cavity formed by the female element, projecting in the open position of the mold and movable under the action of the male element in the advancing direction thereof, against a return force; and synthetic material is injected from the male element and against the face of the film opposite said male element.

3. The machine for fabricating, by injection of synthetic material, containers including a film forming an external at least partial coating and forming an integral part of the containers, of the type including:

a mold formed of a male punch element adapted for cooperating with a female die element;

at least one nozzle for injecting synthetic material into the space left between said male and female elements in the closed positions of the molds;

a device for feeding precut films into said mold; and

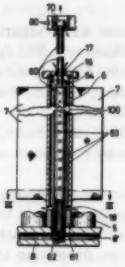
means for holding the film against the male element during closure of the mold, wherein the synthetic material injection nozzle is carried by the male element of the mold; and said holding means comprise at least one slider housed in the cavity formed by the female element, projecting in the open position of the mold and adapted for cooperating with the male element for holding the film thereagainst during closure of the mold, said slider being movable under the action of the male element, in the advancing direction thereof, against a return force.

4,686,077

NUCLEAR REACTOR INSTALLATION

Herman Straub, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Aug. 27, 1985, Ser. No. 770,156
Claims priority, application Switzerland, Sep. 3, 1984, 4200/84; European Pat. Off., Dec. 1, 1984, 84114642.6
Int. Cl.[4] G21C *7/16*
U.S. Cl. 376—230 20 Claims



1. A nuclear reactor installation comprising

a pressure vessel;

a reactor core within said vessel, said core including straight vertical channel-like fuel elements for containing fissile material, vertically movable control rods between said fuel elements and absorber rods secured to said control rods between said fuel elements;

a plurality of guide rods, each guide rod being disposed within and extending from a respective control rod to define an annular gap therebetween and having a tubular bottom half disposed in immobile relation to said fuel elements, each guide rod having a plurality of bores communicating an interior of said guide rod with said annular gap;

conveying means for conveying a coolant from said pressure vessel into said interior of each said guide rod to move said control rods;

a first annular restrictor at one end of each said control rod communicating said annular gap with the interior of said pressure vessel; and

a second annular restrictor at an opposite end of each said control rod communicating said annular gap with the interior of said pressure vessel;

said communicating bores and said restrictors being sized whereby said control rods move in one axial direction in response to an increasing quantity of coolant flow into said guide rod interiors and in an opposite axial direction in response to a decreasing quantity of coolant flow into said guide rod interiors.

4,686,078

METHOD AND APPARATUS FOR DISPLACING A REACTOR WELD SCANNER ASSEMBLY BY VARIABLE BUOYANCY

Bernardus M. Zwart, Jr., New Canaan, Conn., assignor to Nuclear Energy Services, Inc., Danbury, Conn.

Filed Apr. 8, 1985, Ser. No. 721,180
Int. Cl.[4] G21C *17/00*; G01N *29/04, 9/24*
U.S. Cl. 376—249 18 Claims

10. A method of displacing a weld scanner in and out of a horizontal reactor vessel nozzle, wherein two spaced vertical guide studs extend upwardly from an upper circular vessel flange approximately 120 degrees apart with the studs and vessel submerged in a water pool, the scanner being mounted on a horizontal positively driven telescopic boom to which a vertical column is attached which is slideable between stop limits and rotatable within and can be braked with respect to a hub of a spider having three equally spaced legs adapted to

span the flange with clamps on the outer ends of two of the legs adapted to slide on and grip two of the studs, each of the columns and spider legs defining one buoyancy chamber and the boom defining two fore and aft buoyancy chambers into which air and water may be introduced, comprising the steps of

(a) introducing air into each of the buoyancy chambers,

(b) floating the scanner-boom-column-spider assembly in the pool with the upper end of the column extending above and the scanner and boom extending below the water surface,

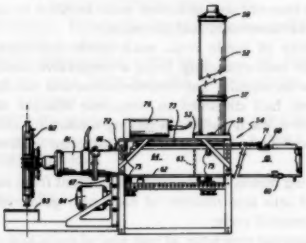
(c) introducing some water separate from the pool water into the boom chamber while controlling the braking of the hub and column to cause the scanner-boom-column to sink relative to the spider until the column is stopped at its lower limit in the hub,

(d) braking the hub to the column,

(e) affixing positioning rod means coaxially to the upper end of the column,

(f) introducing more water separate from the pool water into all of the buoyancy chambers to sink the scanner-boom-column-spider assembly at substantially neutral buoyancy with the rod means projecting at its upper end above the pool surface,

(g) manipulating the rod means and introducing more water separate from the pool water into all of the buoyancy chambers so that the two leg clamps are lowered about



two of the studs and all three spider legs descend onto the vessel flange,

(h) closing the two clamps to fix the spider relative to the vessel,

(i) moving the rod means vertically and rotating it to bring the scanner to a level coaxial with the nozzle,

(j) positively extending the telescopic boom to enable inspection by the scanner in the nozzle,

(k) positively retracting the boom after inspection,

(l) introducing air into the spider leg chambers to render them positively buoyant while the other chambers are still negatively buoyant,

(m) rotating the boom by the rod means so that it is under the spider leg without a clamp,

(n) opening the spider clamps,

(o) introducing air first into the boom fore chamber and then into the boom aft chamber so that the entire assembly is buoyant,

(p) manipulating and then detaching the rod means as the assembly floats upwardly off the studs and to the surface. the assembly floats upwardly off the studs and to the surface.

(q) introducing air into all of the chambers when the assembly is on the pool surface.

(r) ceasing the braking of the hub on the column to cause the scanner-boom-column to rise relative to the spider until the column is stopped at its upper limit in the hub, and

(s) removing the assembly from the pool.

4,686,079

FUEL ASSEMBLY

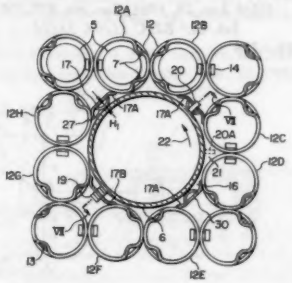
Toshimitsu Ishikawa, Yokohama; Mishihiro Ozawa, Hitachi; Mikio Sakurai, Mito; Mutsuo Konno, Hitachi; Yasuhiro Aizawa, Hitachi; Takao Igarashi, Hitachi, and Hiromasa Hirakawa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Engineering Co., Ltd., Ibaraki, both of, Japan

Filed Oct. 17, 1985, Ser. No. 788,590

Claims priority, application Japan, Oct. 17, 1984, 59-218110

Int. Cl.[4] G21C *3/32*

U.S. Cl. 376—444 **11 Claims**



1. A fuel assembly comprising:

an upper tie plate;

a lower tie plate;

a plurality of fuel rods, each having both ends thereof held by said upper and lower tie plates;

a water rod disposded between said fuel rods, said water rod having the lower end thereof held by said lower tie plate and having an outer diameter greater than that of respective ones of said fuel rods; and

a fuel spacer having a large number of circular members for the insertion of said fuel rods, and having a plurality of bridge members having both ends thereof fitted respectivley to two of said circular members adjacent one antother and also adjacent said water rod;

said bridge members being held by projections formed on side surfaces of said water rod.

4,686,080

COMPOSITE COMPACT HAVING A BASE OF A HARD-CENTERED ALLOY IN WHICH THE BASE IS JOINED TO A SUBSTRATE THROUGH A JOINT LAYER AND PROCESS FOR PRODUCING THE SAME

Akira Hara; Masaya Miyake, and Shuji Yazu, all of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 440,705, Nov. 8, 1982, abandoned. This application Dec. 9, 1985, Ser. No. 805,590

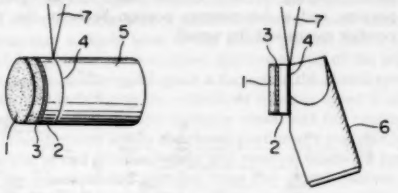
Claims priority, application Japan, Nov. 9, 1981, 56-180053; Nov. 9, 1981, 56-180054; Jun. 24, 1982, 57-109171; Aug. 23, 1982, 57-127650; Aug. 23, 1982, 57-127651; Aug. 24, 1982, 57-147370; Aug. 27, 1982, 57-149649; Aug. 31, 1982, 57-152112

Int. Cl.[4] B22F *7/08*

U.S. Cl. 419—8 **7 Claims**

1. A process for the production of a composite compact component, which comprises sandwiching a thin sheet of a high strength metal or alloy, as a filler metal, having a thickness of at most 2 mm between the end of a base of a composite compact and the end of a substrate of a hard sintered alloy or steel having a larger volume than the base, the composite compact consisting of a diamond or BN compact containing at least 50% by volume of diamond or BN powder and the base of a hard sintered alloy bonded during sintering under an ultra-high pressure and high temperature directly or through an interlayer with a thickness of at most 0.5 mm to the diamond or BN compact, then heating and melting the thin sheet at a temperature of at least the liquidus point of the hard sintered

alloy by a high energy electron or laser beam and thereby welding or bonding the base and substrate; said hard senitered alloy consisting of at least one member selected from the group consisting of carbides, carbonitrides, nitrides and carboxynitrides of Ti, Zr, Hf, Cr, V, Nb, W, Mo, and Ta and solid solutions thereof, bonded by at least one member selected from iron group metals, and wherein the filler metal has a melting point at least as high as that of the liquidus point of the hard sintered alloy.



4,686,081

METHOD FOR ADDITION OF LOW-MELTING POINT METAL

Kiyoshi Takashima; Isao Suzuki; Masashi Yoshida; Ryutatsu Tanaka; Noriyuki Masumitsu; Kazuhiro Kinoshita, and Hiromi Ishii, all of Muroran, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 829,813, Feb. 14, 1986, abandoned. This application May 21, 1986, Ser. No. 865,472

Claims priority, application Japan, Feb. 18, 1985, 60-29895; Feb. 18, 1985, 60-29896; Apr. 19, 1985, 60-82538; May 8, 1985, 60-95898

Int. Cl.⁴ C22C *33/00*

U.S. Cl. 420—29 **4 Claims**

1. In a method of adding a low-melting point metal to liquid steel within a ladle, the improvement wherein a low-melting point metal component consisting of at least one member selected from the group consisting of lead, bismuth, lead oxide and bismuth oxide is mixed with at least one member selected from the group consisting of quick lime and a carbonaceous material in the amounts that satisfy the relations expressed by the following formulas, and the mixture is blown into the liquid steel through an injection lance together with a gas:

$$x+y+z+m=1$$

$$5.5x+3.3y+z+m\leqq 5.0$$

$$0\leqq x<1$$

$$0\leqq y<1$$

$$0\leqq z\leqq 0.30$$

$$0\leqq m<0.25$$

$$0\leqq z+m\leqq 0.30$$

wherein x, y, z and m represent the weight proportions of the said low-melting point metal, an oxide of said low-melting point metal, quick lime and the carbonaceous material, respectively.

4,686,082

DENTAL AMALGAM ALLOY

Graham J. Parker, Malvern, Australia, assignor to Jeffery J. Cheetham, Bayswater, Australia

Filed Jul. 2, 1984, Ser. No. 626,722

Claims priority, application Australia, Jul. 8, 1983, PG0209; Aug. 1, 1983, PG0594

Int. Cl.⁴ C22C *5/08*

U.S. Cl. 420—503 **5 Claims**

1. A particulate dental amalgam alloy consisting of spherical particles formed of a dental amalgam alloy consisting essentially of, as alloying ingredients, from about 40 to 50% by weight silver, from about 20 to 30% by weight tin, from about 15 to 30% by weight copper, from about 0.5 to about 2% by weight indium, from 0 to about 1% by weight zinc and from about 0.03 to 0.5% by weight platinum, in which the alloying ingredients are substantially uniformly distributed through each particle.

4,686,083

ALUMINUM ALLOY SUPPORT FOR A LITHOGRAPHIC PRINTING PLATE

Kazushige Takizawa; Hirokazu Sakaki, both of Shizuoka; Yuji Abe; Mamoru Matsuo, both of Fukaya; Akira Tajiri, Kawamoto, and Shin Tsuchida, Nagoya, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa; Sumitomo Light Metal Industries, Ltd. and Skyaluminium Co., Ltd., both of Tokyo, all of, Japan

Filed Apr. 26, 1985, Ser. No. 727,475

Claims priority, application Japan, Apr. 27, 1984, 59-83874

Int. Cl.⁴ C22C *21/00*

U.S. Cl. 420—548 **5 Claims**

1. A lithographic printing plate support comprising a plate formed from an aluminum alloy consisting essentially of Mn in an amount equal to or greater than 0.05% and less than 0.8% by weight, Si in an amount not exceeding 0.2% by weight, Fe in an amount not exceeding 0.5% by weight, Ti in an amount not exceeding 0.1% by weight for fine crystal formation, B in an amount not exceeding 0.02% by weight for fine crystal formation, minor trace impurities, and the balance Al.

4,686,084

BENZOYL ALANINES AND THEIR USE AS CORROSION INHIBITORS

Juergen Geke, Duesseldorf, and Josef Penninger, Hilden, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

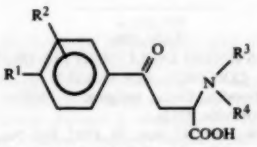
Filed Mar. 18, 1985, Ser. No. 713,123

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1984, 3416120

Int. Cl.⁴ C23F *11/12*

U.S. Cl. 422—17 **10 Claims**

1. A method for preventing corrosion of metals from contact with an aqueous solution comprising adding to said aqueous solution a corrosion-inhibiting quantity of at least one benzoyl alanine of the formula



(I)

wherein R^1 and R^2 can be the same or different and represent hydrogen or an alkyl radical containing from 1 to 12 carbon atoms and R^3 and R^4 can be the same or different and represent hydrogen, an unbranched or branched alkyl radical containing from 1 to 10 carbon atoms, hydroxyalkyl, alkoxyalkyl, carboxyalkyl or alkylaminoalkyl radicals containing from 1 to 3 car-

bon atoms in the alkyl groups thereof, and wherein R^3 and R^4 together can be the $—CH_2CH_2—O—CH_2CH_2—$ group or the $—CH_2CH_2CH_2CH_2CH_2—$ group which form with the nitrogen atom the morpholino or the piperidino ring, or an alkali metal or an ammonium salt of the above benzoyl alanine with a base from the group consisting of ammonia, mono-, di- or triethanolamine.

4,686,085

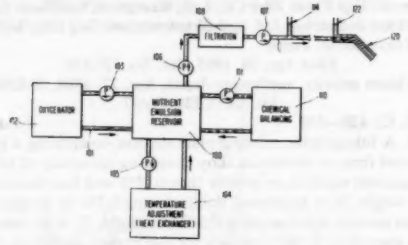
STROKE TREATMENT UTILIZING EXTRAVASCULAR CIRCULATION OF OXYGENATED SYNTHETIC NUTRIENTS TO TREAT TISSUE HYPOXIC AND ISCHEMIC DISORDERS

Jewell L. Osterholm, Radnor Township, Delaware County, Pa., assignor to Thomas Jefferson University, Philadelphia, Pa.

Division of Ser. No. 428,850, Sep. 30, 1982, Pat. No. 4,445,500, which is a division of Ser. No. 354,346, Mar. 3, 1982, Pat. No. 4,445,886, which is a continuation-in-part of Ser. No. 139,886, Apr. 14, 1980, Pat. No. 4,378,797, Ser. No. 275,117, Jun. 18, 1981, Pat. No. 4,445,594, and Ser. No. 275,116, Jun. 28, 1981, Pat. No. 4,393,863. This application Feb. 23, 1984, Ser. No. 582,961

Int. Cl.[4] A61M *1/14, 1/34, 1/36*

U.S. Cl. 422—45 **10 Claims**



1. An oxygenation apparatus for use in treating hypoxic ischemic neurologic tissue comprising:

(a) reservoir means for containing synthetic organic oxygenatable fluid which is physiologically acceptable to neurologic tissue;

(b) oxygenator means connected in fluid communication with said fluid in said reservoir means for oxygenating said fluid;

(c) first flow control means for establishing a circulation of said fluid between said oxygenator means and said reservoir means at a first preselected rate;

(d) injection means connected in fluid communication with said fluid in said reservoir means for injecting said fluid into the extravascular cerebrospinal pathway;

(e) second flow control means for establishing flow of said fluid through said injection means at a second preselected rate; and

(f) withdrawal means for withdrawing of fluid from said cerebrospinal pathway.

4,686,086

PROCESS SYSTEM INCLUDING FLUID FLOW CONTROL APPARATUS

Fred Rowe, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 427,247, Sep. 29, 1982, Pat. No. 4,495,028, which is a division of Ser. No. 278,129, Jun. 26, 1981, Pat. No. 4,375,524. This application Oct. 29, 1984, Ser. No. 666,063

Int. Cl.[4] G05D *7/03;* **F17D** *1/14*

U.S. Cl. 422—111 **2 Claims**

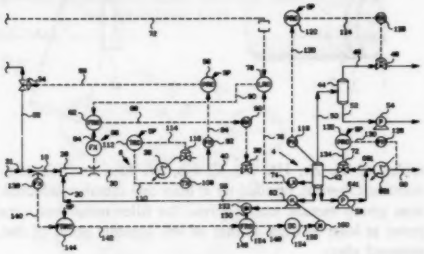
1. Apparatus comprising:

(a) a pressure vessel;

(b) a first conduit means emptying into the pressure vessel;

(c) a second conduit means connected to an upper portion of the pressure vessel;

(d) a third conduit means connected to a lower portion of the pressure vessel and establishing a flow path between the pressure vessel and the first conduit means, said third means dividing the first conduit means into an upstream portion, and a downstream portion between the third conduit means and the vessel;



(e) a means cooperating with the upstream portion of the first conduit means for sensing liquid flow through the upstream portion of the first conduit means and establishing a signal representative of said liquid flow; and

(f) a pump cooperating with the third conduit means and having a motor connected to the means for establishing the signal for receiving the signal representative of liquid flow through the first conduit means and causing liquid flow from the vessel and to the first conduit means in response to said signal.

4,686,087

APPARATUS FOR THERMOPLASTIC RESINS PRE-EXPANDING PROCESS

Hirofumi Maeda, Takatsuki; Kyoichi Nakamura, and Toshihiro Hatamoto, both of Osaka, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

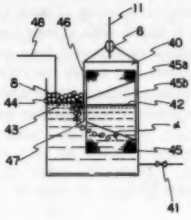
Division of Ser. No. 647,661, Sep. 6, 1984, Pat. No. 4,524,154. This application Feb. 11, 1985, Ser. No. 700,180

Claims priority, application Japan, Nov. 12, 1983, 212870/83

The portion of the term of this patent subsequent to Jun. 18, 2002, has been disclaimed.

Int. Cl.[4] C08J *9/18;* **B01J** *10/00*

U.S. Cl. 422—133 **4 Claims**



1. An apparatus for preparing pre-expanded particles of a thermoplastic resin which comprises a pressure vessel for heating under an elevated pressure an aqueous dispersion comprising thermoplastic resin particles containing a volatile foaming agent and an aqueous liquid; a low-pressure vessel for pre-expanding said thermoplastic resin particles; release line means for releasing the aqueous dispersion from the pressure vessel into the low-pressure vessel; said low-pressure vessel comprising wall means defining a closed portion and an open portion, and a separation wall; the thermoplastic resin particles containing the volatile foaming agent released through said release line means being pre-expanded and the volatile foaming

agent contained in the particles being volatilized within said closed portion, said closed portion and open portion bein partitioned by the separation wall which has a lower end spaced from a bottom wall of the low-pressure vessel, and said closed portion and said open portion communicating with each other through a space between the lower end of said separation wall and the bottom wall of said low-pressure vessel; means for maintaining a liquid level in the closed portion and a liquid level in the open portion above said lower end of the separation wall so that a sealed space is formed in the closed portion; means for discharging the volatilized foaming agent from the closed portion of the low-pressure vessel and for controlling the inner pressure within the closed portion at a pressure lower than that in said pressure vessel; and removal means for removing the pre-expanded particles from the closed portion; said removal means comprising a rotary impeller partially submerged within the aqueous liquid within said closed portion of the low-pressure vessel, said rotary impeller being arranged such that the pre-expanded particles accumulated on the liquid surface within the closed portion are caught by the impeller, submerged under the liquid surface with revolution of the impeller and forced towards the open portion of the low-pressure vessel through the aqueous liquid.

4,686,088

APPARATUS FOR PRODUCING LONG-CHAIN POLYMERS, ESPECIALLY POLYESTERS

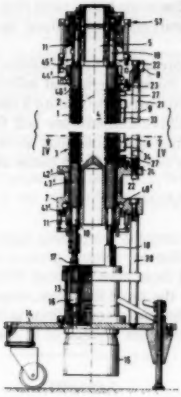
Rudolf P. Fritsch, Goslarer Str. 58, D-7000 Stuttgart 31, Fed. Rep. of Germany

Filed Apr. 8, 1986, Ser. No. 849,571

Claims priority, application Fed. Rep. of Germany, Apr. 16, 1985, 3513536

Int. Cl.[4] B01F *7/26;* **B01J** *14/00*

U.S. Cl. 422—135 **9 Claims**



1. Apparatus for producing long-chain polymers, especially polyesters, having several shafts (1) arranged vertically and located in ring distribution inside a common housing (6, 7, 8, 9),

said shafts having parallel axes and being driven in a common direction,

a plurality of disk-shaped processing elements (3) carried by respective shafts, and arranged axially in a row and in parallel planes,

the elements of adjacent shafts being intermeshed while leaving narrow gaps of predetermined width and enclosing at least one cavity (4) which cavity is under negative pressure, the processing elements being so positioned and arranged that their circumferential surfaces are exposed to the cavity,

the shafts (1) being rotatably mounted in the housing; and material input (44') and output (40') arrangements formed in the housing, wherein

the housing (6) comprises

a tubular housing liner (9) surrounding the shafts (1) and having a cylindrical inner wall (54) extending tangentially to circumferential surfaces of the processing elements (3) on the shafts (1) and leaving a narrow gap (55) of defined width;

two coaxial stationary housing sections (7, 8) located at respective ends of the tubular housing liner, and sealing and closing off the ends of the housing liner (9); and

a drive arrangement (37) providing an oscillating rotational movement coupled to the housing liner (9) and rotatably oscillating the housing liner.

4,686,089

SIEVE-PLATE COLUMN FOR COUNTERFLOW EXTRACTION

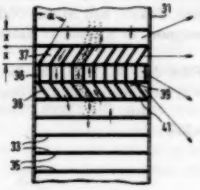
Karlheinz Haberland, Bruchsal, Fed. Rep. of Germany, assignor to Wiederaufarbeitungsanlage Karlsruhe Betriebsgesellschaft mbH, Eggenstein-Leopoldshafen, Fed. Rep. of Germany

Filed Feb. 25, 1986, Ser. No. 833,356

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506693

Int. Cl.[4] G21C *19/50;* **G21F** *9/20;* **B01D** *11/04*

U.S. Cl. 422—159 **9 Claims**



9. A sieve-plate column for the liquid-liquid counterflow extraction of two phases in a nuclear facility for reprocessing irradiated nuclear fuels, the two phases being of different weights and not soluble one in the other, the sieve-plate column defining a longitudinal axis and comprising:

a plurality of sieve plates arranged transversely to said axis; and,

a static mixing element connected directly between two mutually adjacent ones of said sieve plates for cross mixing the two phases as the latter pass therethrough, the static mixing element including a plurality of channels one adjacent the other arranged over the entire cross-section of said element, said channels communicating with apertures in said sieve plates and being inclined with respect to the direction of flow so as to cause the upper opening thereof to be radially displaced from lower opening thereof and being arranged so as to cause a radial displacement of the flow paths that are formed.

4,686,090

DESULFURIZING OF REDUCING GAS STREAM USING A RECYCLE CALCIUM OXIDE SYSTEM

John L. Howell, North Huntingdon Township, Westmoreland County; Joseph E. McGreal, Jr., Penn Hills Township, Allegheny County; Edward J. Nemeth, Mt. Lebanon Township, Allegheny County; Stephen Waslo, Penn Hills Township, Allegheny County, all of Pa., and Jerome Feinman, Grand Junction, Colo., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Dec. 30, 1982, Ser. No. 454,750

Int. Cl.[4] B01J *8/00;* **C01B** *17/00*

U.S. Cl. 423—244 **10 Claims**

1. In a process for producing a low-sulfur content hot reduc-

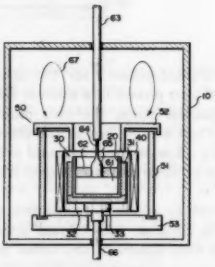
ing gas stream comprising (a) contacting a sulfur bearing hot reducing gas stream with a desulfurizing agent comprising a desulfurizing fixed bed of solid particles comprising calcium oxide to thereby produce as low-sulfur content hot reducing gas stream and a calcium sulfide composition, then (b) contacting said calcium sulfide composition with an oxidizing gas to thereby convert the sulfide of said composition to a regenerated calcium oxide, and sulfur dioxide and then (c) reusing the regenerated calcium oxide in step (a) to desulfurize a hot reducing gas, the improvement comprising avoiding the formation of calcium sulfate when regenerating said calcium sulfide composition by means of a separate clean-up fixed bed after the desulfurzing bed of step (a) to assure complete conversion of the calcium oxide to calcium sulfide in the desulfurizing bed.

4,686,091

APPARATUS FOR MANUFACTURING COMPOUND SEMICONDUCTOR SINGLE CRYSTAL

Syoichi Washizuka; Masayuki Watanabe, both of Yokohama; Sadao Yashiro, Tokyo, and Masae Nakanishi, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 24, 1985, Ser. No. 758,403
Claims priority, application Japan, Sep. 5, 1984, 59-185726
Int. Cl.[4] C30B *27/02*
U.S. Cl. 422—249 **7 Claims**



1. An apparatus for manufacturing a compound semiconductor single crystal by pulling the compound semiconductor single crystal from a raw material melt in a crucible by the LEC method, comprising:

(a) a crucible for containing a raw material melt and a liquid encapsulating material therein;

(b) a heat generator arranged outside said crucible so as to be coaxial therewith;

(c) a heat insulator assembly arranged outside said heat generator so as to surround said heat generator and said crucible, said heat insulating assembly comprising a sintered body formed of a major constituent selected from the group consisting of AlN, Al_2O_3 and ZrO_2, and including an upper heat insulator arranged above the crucible and having at a center thereof a circular through hole for allowing passage of a single crystal pulled from said crucible therethrough, said upper heat insulator further comprises at least two separate segmented members which contact each other; and

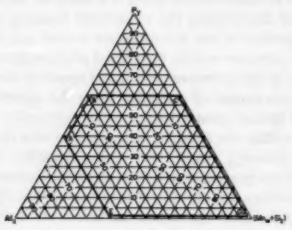
(d) a container for containing said crucible, said heat generator and said heat insulating assembly therein.

4,686,092

MANGANESE-ALUMINUM-PHOSPHORUS-SILICON-OXIDE MOLECULAR SIEVES

Brent M. T. Lok, New City; Bonita K. Marcus, Rye, and Edith M. Flanigen, White Plains, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Apr. 13, 1984, Ser. No. 600,175
Int. Cl.[4] C01B *25/26;* **B01J** *27/18, 27/182*
U.S. Cl. 423—306 **26 Claims**



1. Crystalline molecular sieves having three-dimensional microporous framework structures of MnO_2, AlO_2, PO_2 and SiO_2 tetrahedral oxide units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(Mn_wAl_xP_ySi_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(Mn_wAl_xP_ySi_z)O_2$ and has a value of zero to about 0.3; and "w", "x", "y" and "z" represent the mole fractions of element manganese, aluminum, phosphorus and silicon, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1.

13. Process for preparing the crystalline molecular sieves of claim 1 having a three dimensional microporous framework structures which comprises providing a reaction mixture composition at an effective temperature and for an effective time sufficient to produce the molecular sieves of claim 1 being expressed in terms of molar oxide ratios as follows:

$$aR:(Mn_wAl_xP_ySi_z):bH_2O$$

wherein "R" is an organic templating agent: "a" is the amount of "R" and is an effective amount greater than zero to about 6; "b" has a value of from zero to about 500; and "w", "x", "y" and "z" represent the mole fractions, respectively, of manganese, aluminum, phosphorus and silicon in the $(Mn_wAl_xP_ySi_z)O_2$ constituent, and each has a value of at least 0.01.

4,686,093

MOLECULAR SIEVE COMPOSITIONS WITH ALUMINUM, PHOSPHORUS AND AT LEAST TWO OTHER ELEMENTS

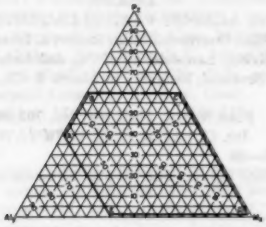
Edith M. Flanigen, White Plains; Brent M. T. Lok, New City; Robert L. Patton, Katonah, and Stephen T. Wilson, Shrub Oak, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Apr. 13, 1984, Ser. No. 600,171
Int. Cl.[4] C01B *25/00;* **B01J** *27/18, 27/188, 27/198*
U.S. Cl. 423—306 **45 Claims**

1. Crystalline molecular sieves having three-dimensional microporous framework structures of MO_2, AlO_2 and PO_2 tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:

$$mR:(M_xAl_yP_z)O_2$$

wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of $(M_xAl_yP_z)O_2$ and has a value of zero to about 0.3; "M" represents at least two elements, M_1 and M_2, selected from the group consisting of arsenic, beryllium, boron, chromium, gallium, germanium, lithium and vanadium; and "x", "y" and "z" represent the mole fractions of M ($=M_1+M_2$ etc.), aluminum and phosphorus, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1 and each mole fraction for M_1, M_2, aluminum and phosphorus has a value of at least 0.01, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of Tables A to H and J to V herein.



31. Process for preparing the crystalline molecular sieves of claim 1 which comprises providing a reaction mixture composition expressed in terms of molar oxide ratios as follows:

$$aR:(M_xAl_yP_z)O_2:bH_2O$$

wherein "R" is an organic templating agent: "a" is the amount of "R" and is an effective amount greater than zero: "b" has a value of from zero to about 500, "M" represents at least two elements capable of forming framework tetrahedral oxides and selected from the group consisting of arsenic, beryllium, boron, chromium, gallium, germanium, lithium and vanadium; "x", "y" and "z" represent the mole fractions, respectively, of "M", aluminum and phosphorus in the $(M_xAl_yP_z)O_2$ constituent, and each has a value of at least 0.01, whereby the molecular sieves of claim 1 are prepared.

4,686,094

TREATMENT OF PYROPHORIC ELEMENTAL PHOSPHORUS-CONTAINING MATERIAL

Auston K. Roberts, Chino; William E. Trainer, Anaheim; Steve Nakamura, Los Alamitos; Leon C. Duffin, Cudahy, all of Calif., and David L. Biederman, Columbia, Tenn., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 8, 1986, Ser. No. 894,529
Int. Cl.[4] C01B *25/01, 25/02, 25/04*
U.S. Cl. 423—322 **14 Claims**

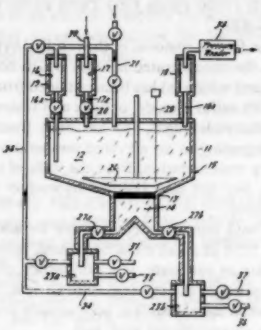
1. A method of treating pyrophoric elemental phosphorus-containing material which comprises contacting the material with an oxygen-containing gas to convert it to a substantially less pyrophoric form while it is otherwise protected from direct contact with oxygen in the atmosphere by being blanketed with a non-flammable fluid.

4,686,095

METHOD OF MAKING ULTRAPURE SILICON NITRIDE PRECURSOR

Elaine C. Beckwith, Riverview, and Robert M. Williams, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 23, 1985, Ser. No. 812,036
Int. Cl.[4] C01B *33/00*
U.S. Cl. 423—324 **27 Claims**



1. A method of making a silicon nitride precursor of a purity greater than 99.95%, comprising:

(a) continuously reacting liquid silicon halide with an excess of liquid ammonia (i) in the effective absence of contaminants, (ii) at a reaction situs in an effectively inert atmosphere to precipitate said silicon nitride precursor, and (iii) with a ratio of silicon halide to liquid ammonia effective to substantially completely react and to solubilize any gas reaction products and maintain required viscosity of solution/suspension mix for filtering;

(b) simultaneously and continuously filtering and withdrawing a filtered portion of said excess of liquid ammonia to leave said silicon nitride precursor precipitate in the reaction situs; and

(c) adding ammonia to said reaction situs to replace the withdrawn filtered portion of said liquid ammonia and to assist in maintaining the liquidity of said excess of liquid ammonia.

4,686,096

CHOPPED CARBON FIBERS AND METHODS FOR PRODUCING THE SAME

David A. Schulz, Fairview Park, and Loren C. Nelson, Strongsville, both of Ohio, assignors to Amoco Corporation, Chicago, Ill.

Filed Jul. 20, 1984, Ser. No. 632,839
Int. Cl.[4] D01F *9/12*
U.S. Cl. 423—447.1 **5 Claims**

1. A process for manufacturing chopped carbon yarn, consisting essentially of:

(a) spinning pitch into a plurality of continuous fibers;

(b) combining the plurality of continuous fibers to form a pitch yarn;

(c) treating the pitch yarn with an aqueous composition comprising nitric acid and a water-soluble surfactant

(d) chopping the treated pitch yarn into short lengths suitable for injection molding;

(e) collecting the chopped pitch yarn into a bulk form; and then

(f) subjecting the chopped pitch yarn in bulk form to a heat treatment in a substantially non-reactive atmosphere to produce the chopped carbon yarn.

4,686,097

PROCESS FOR THE REMOVAL OF THE RESIDUAL SULFURIC ACID FROM THE REACTION MIXTURE PRODUCED IN THE SULFOXIDATION OF PARAFFINS

Ernst Höroldt, and Adam Urschel, both of Kelkheim, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 2, 1985, Ser. No. 719,267

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1984, 3412844

Int. Cl.[4] C01B *17/96;* **C01D** *5/00;* **C07B** *45/02;* **C07C** *143/52*

U.S. Cl. 423—520 **5 Claims**

1. A process for the removal of the residual byproduct sulfuric acid from the concentrated mixture which contains alkanesulfonic acid and which (a) has been obtained from the reaction of paraffin with sulfur dioxide, oxygen and water under irradiation with ultraviolet light, (b) has been freed from sulfur dioxide by degassing at an elevated temperature and (c) has been freed, by concentration, from the bulk of the byproduct sulfuric acid, but not said residual byproduct sulfuric acid, which comprises

adding to said concentrated mixture an alkali metal salt selected from an alkali metal carbonate, peroxide, hydroxide, sulfate or sulfonate, at a rate which provides partial neutralization of the residual sulfuric acid, thereby forming the alkali metal bisulfate, substantially without neutralizing the alkanesulfonic acid, and

removing the alkali metal bisulfate from the alkanesulfonic acid.

4,686,098

ENCAPSULATED MOUSE CELLS TRANSFORMED WITH AVIAN RETROVIRUS-BOVINE GROWTH HORMONE DNA, AND A METHOD OF ADMINISTERING BGH IN VIVO

John J. Kopchick, Verona; Frederick C. Leung, Scotch Plains; Thomas J. Livelli, Lyndhurst, and Richard H. Malavarca, South Orange, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed May 14, 1984, Ser. No. 609,924

Int. Cl.[4] A61K *9/44;* **A01N** *25/10;* **C12N** *11/02, 11/04*

U.S. Cl. 424—15 **3 Claims**

1. The method for increasing animal growth by implantation in vivo in cows an effective amount of the encapsulated cell line L-BGH-4-3, ATCC CRL 8537 or L-BGH-4-13, ATCC CRL-8536.

4,686,099

AEROSOL WATERPROOF SUNSCREEN COMPOSITIONS

Victor Palinczar, 435 Adeline St., Trenton, N.J. 08611

Filed Dec. 10, 1985, Ser. No. 807,488

Int. Cl.[4] A61K *7/42, 7/44, 9/12*

U.S. Cl. 424—47 **21 Claims**

1. An aerosol water-proof sunscreen composition comprising:

A. from about 20% to about 90% by weight of a monohydric alcohol;

B. from about 0.1% to about 5.0% by weight of ethylcellulose polymer having an average ethoxyl substitution from about 2.20 to about 2.65 and an ethoxyl content from about 44.8% to about 52.2%;

C. from about 1.0% to about 20.0% by weight of an active ultraviolet radiation absorber; and

D. from about 10% to about 7.5% by weight of a liquified propellant.

4,686,100

METHOD FOR THE TREATMENT OF ADULT RESPIRATORY DISTRESS SYNDROME

Thomas A. Raffin, and John H. Stevens, both of Palo Alto, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Apr. 2, 1985, Ser. No. 718,918

Int. Cl.[4] A61K *39/00*

U.S. Cl. 424—85 **8 Claims**

1. A method for treating adult respiratory distress syndrome (ARDS) in a subject in need thereof which comprises administering to said subject an antibody to complement component C5a or the des Arg derivative thereof in an amount effective to treat ARDS.

8. The method of claim 1 wherein the subject is a human.

4,686,101

VACCINE AGAINST VARICELLA-ZOSTER VIRUS

Ronald W. Ellis, Overbrook Hills; Robert S. Lowe, Harleysville; Paul M. Keller, Lansdale, all of Pa., and Andrew J. Davison, Glasgow, Scotland, assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 2, 1985, Ser. No. 762,001

Int. Cl.[4] A61K *39/00;* **C07K** *13/00*

U.S. Cl. 424—88 **2 Claims**

1. A purified polypeptide having the amino acid sequence:

Met Phe Val Thr Ala Val
Val Ser Val Ser Pro Ser Ser Phe Tyr Glu Ser Leu Gln Val
Glu Pro Thr Gln Ser Glu Asp Ile Thr Arg Ser Ala His Leu
Gly Asp Gly Asp Glu Ile Arg Glu Ala Ile His Lys Ser Gln
Asp Ala Glu Thr Lys Pro Thr Phe Tyr Val Cys Pro Pro Pro
Thr Gly Ser Thr Ile Val Arg Leu Glu Pro Thr Arg Thr Cys
Pro Asp Tyr His Leu Gly Lys Asn Phe Thr Glu Gly Ile Ala
Val Val Tyr Lys Glu Asn Ile Ala Ala Tyr Lys Phe Lys Ala
Thr Val Tyr Tyr Lys Asp Val Ile Val Ser Thr Ala Trp Ala
Gly Ser Ser Tyr Thr Gln Ile Thr Asn Arg Tyr Ala Asp Arg
Val Pro Ile Pro Val Ser Glu Ile Thr Asp Thr Ile Asp Lys
Phe Gly Lys Cys Ser Ser Lys Ala Thr Tyr Val Arg Asn Asn
His Lys Val Glu Ala Phe Asn Glu Asp Lys Asn Pro Gln Asp
Met Pro Leu Ile Ala Ser Lys Tyr Asn Ser Val Gly Ser Lys
Ala Trp His Thr Thr Asn Asp Thr Tyr Met Val Ala Gly Thr
Pro Gly Thr Tyr Arg Thr Gly Thr Ser Val Asn Cys Ile Ile
Glu Glu Val Glu Ala Arg Ser Ile Phe Pro Tyr Asp Ser Phe
Gly Leu Ser Thr Gly Asp Ile Ile Tyr Met Ser Pro Phe Phe
Gly Leu Arg Asp Gly Ala Tyr Arg Glu His Ser Asn Tyr Ala
Met Asp Arg Phe His Gln Phe Glu Gly Tyr Arg Gln Arg Asp
Leu Asp Thr Arg Ala Leu Leu Glu Pro Ala Ala Arg Asn Phe
Leu Val Thr Pro His Leu Thr Val Gly Trp Asn Trp Lys Pro
Lys Arg Thr Glu Val Cys Ser Leu Val Lys Trp Arg Glu Val
Glu Asp Val Val Arg Asp Glu Tyr Ala His Asn Phe Arg Phe
Thr Met Lys Thr Leu Ser Thr Thr Phe Ile Ser Glu Thr Asn
Glu Phe Asn Leu Asn Gln Ile His Leu Ser Gln Cys Val Lys
Glu Glu Ala Arg Ala Ile Ile Asn Arg Ile Tyr Thr Thr Arg
Tyr Asn Ser Ser His Val Arg Thr Gly Asp Ile Gln Thr Tyr
Leu Ala Arg Gly Gly Phe Val Val Val Phe Gln Pro Leu Leu
Ser Asn Ser Leu Ala Arg Leu Tyr Leu Gln Glu Leu Val Arg
Glu Asn Thr Asn His Ser Pro Gln Lys His Pro Thr Arg Asn
Thr Arg Ser Arg Arg Ser Val Pro Val Glu Leu Arg Ala Asn
Arg Thr Ile Thr Thr Thr Ser Ser Val Glu Phe Ala Met Leu
Gln Phe Thr Tyr Asp His Ile Gln Glu His Val Asn Glu Met
Leu Ala Arg Ile Ser Ser Ser Trp Cys Gln Leu Gln Asn Arg
Glu Arg Ala Leu Trp Ser Gly Leu Phe Pro Ile Asn Pro Ser
Ala Leu Ala Ser Thr Ile Leu Asp Gln Arg Val Lys Ala Arg
Ile Leu Gly Asp Val Ile Ser Val Ser Asn Cys Pro Glu Leu
Gly Ser Asp Thr Arg Ile Ile Leu Gln Asn Ser Met Arg Val
Ser Gly Ser Thr Thr Arg Cys Tyr Ser Arg Pro Leu Ile Ser
Ile Val Ser Leu Asn Gly Ser Gly Thr Val Glu Gly Gln Leu
Gly Thr Asp Asn Glu Leu Ile Met Ser Arg Asp Leu Leu Glu
Pro Cys Val Ala Asn His Lys Arg Tyr Phe Leu Phe Gly His
His Tyr Val Tyr Tyr Glu Asp Tyr Arg Tyr Val Arg Glu Ile
Ala Val His Asp Val Gly Met Ile Ser Thy Tyr Val Asp Leu
Asn Leu Thr Leu Leu Lys Asp Arg Glu Phe Met Pro Leu Gln
Val Tyr Thr Arg Asp Glu Leu Arg Asp Thr Gly leu Leu Asp
Tyr Ser Glu Ile Gln Arg Arg Asn Gln Met His Ser Leu Arg
Phe Tyr Asp Ile Asp Lys Val Val Val Gln Tyr Asp Ser Gly Thr
Ala Ile Met Gln Gly Met Ala Gln Phe Phe Gln Gly Leu Gly
Thr Ala Gly Gln Ala Val Gly His Val Val Leu Gly Ala Thr

-continued

Gly Ala Leu Leu Ser Thr Val His Gly Phe Thr Thr Phe Leu
Ser Asn Pro Phe Gly Ala Leu Ala Val Gly Leu Leu Val Leu
Ala Gly Leu Val Ala Ala Phe Phe Ala Tyr Arg Tyr Val Leu
Lys Leu Lys Thr Ser Pro Met Lys Ala Leu Tyr Pro Leu Thr
Thr Lys Gly Leu Lys Gln Leu Pro Glu Gly Met Asp Pro Phe
Ala Glu Lys Pro Asn Ala Thr Asp Thr Pro Ile Glu Glu Ile
Gly Asp Ser Gln Asn Thr Glu Pro Ser Val Asn Ser Gly Phe
Asp Pro Asp Lys Phe Arg Glu Ala Gln Glu Met Ile Lys Tyr
Met Thr Leu Val Ser Ala Ala Glu Arg Gln Glu Ser Lys Ala
Arg Lys Lys Asn Lys Thr Ser Ala Leu Leu Thr Ser Arg Leu
Thr Gly Leu Ala Leu Arg Asn Arg Arg Gly Tyr Ser Arg Val
Arg Thr Glu Asn Val Thr Gly Val.

4,686,102

MULTIVALENT PNEUMOCOCCAL VACCINE AND PREPARATION THEREOF

Mary B. Ritchey, Norwood; Francis R. Cano, Mahwah, both of N.J.; Gerald J. O'Hara, Pearl River, N.Y.; James D. English, Oradell, N.J., and Wenlii Lin, New City, N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Filed Apr. 12, 1984, Ser. No. 599,318

Int. Cl.[4] A61K *39/116*

U.S. Cl. 424—92 **10 Claims**

1. In a multivalent pneumococcal vaccine comprising effective amounts of immunologically active purified pneumococcal capsular polysaccharide (substantially absent "C" polysaccharide) of pneumococcal types (Danish designation) consisting of 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, 33F, and from none to one or both of 6A and 25; the improvement wherein effectively immunogenic Type 3 pneumococcal polysaccharide is purified from a clarified fermentation lysate by the process of

(a) precipitating with 0.15 and 0.5 volumes of alcohol, the lysate being at a pH of about 6.7 and having a final sodium acetate concentration of about 4% and being at a temperature of 2°–6° C., and

(b) redissolving such precipitate, and

(c) repeating Step (a) at about 0.25 to 0.6 volumes of alcohol, and

(d) repeating Step (b), and

(e) repeating Step (a) with 0.1 to 0.5 volumes of alcohol, and

(f) repeating Step (b), and

(g) fractionally precipitating impurities from the polysaccharide of (f) with hexadecyltrimethylammonium bromide at a temperature of from 21°–25° C. and a pH of 7.4±0.1, and a hexadecyltrimethylammonium bromide concentration of 0.1 to 0.5 volumes percent based on a 10% hexadecyltrimethylammonium bromide solution, and

(h) reprecipitating the polysaccharide at a pH of about 6.7 with about 4% sodium acetate and about a 0.50 volume of alcohol, and redissolving in pyrogen-free water, and

(i) repeating Step (h) 2 times, and

(j) purifying the polysaccharide solution of (i) with activated charcoal at a pH of 6.1 and a sodium chloride concentration of 0.15M, by adding activated charcoal in suspension to a concentration of from 3% to 7% based on a 20% activated charcoal suspension, and the solution standing chilled for about 30 minutes and filtering out said activated charcoal, and

(k) diafiltering the solution against distilled water, and

(l) freezing and lyophilizing the resultant product.

4,686,103

METHOD OF MANAGING CATTLE BREEDING HERDS

Lloyd L. Anderson, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Jul. 25, 1985, Ser. No. 759,474

Int. Cl.[4] A61K *37/24, 31/557, 31/565*

U.S. Cl. 424—97 **4 Claims**

1. In the management of a cattle breeding herd, the method of accelerating the birth of calves while minimizing the incidence of calving difficulties and retained placenta, consisting essentially of:

(a) prior to parturition of a pregnant cow but not over ten days before the predicted full term date for the cow, administering relaxin to the cow, the relaxin being administered by an effective route at a dose level corresponding to 1,000 to 10,000 units of purified porcine relaxin; and

(b) during said time period also administering to said cow a parturition inducing agent selected from the group consisting of glucocorticoids and prostaglandins, said agent being given in an amount effective for accelerating parturition so that parturition occurs for the cow within a period of less than sixty hours.

4,686,104

METHODS OF TREATING BONE DISORDERS

Richard S. Bockman, and Raymond P. Warrell, Jr., both of New York, N.Y., assignors to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

Continuation-in-part of Ser. No. 729,057, Apr. 30, 1985. This application Apr. 22, 1986, Ser. No. 853,144

Int. Cl.[4] A61K *33/24, 31/28*

U.S. Cl. 424—131 **31 Claims**

1. A method of decreasing bone resorption comprising administering to a subject with a bone resorptive disorder a pharmaceutically acceptable composition containing a germanium or platinum containing compound useful in decreasing bone resorption in an amount sufficient to cause bone resorption.

4,686,105

GRANULAR PRODUCT CONTAINING MAGNESIUM OXIDE AS ITS MAIN CONSTITUENT

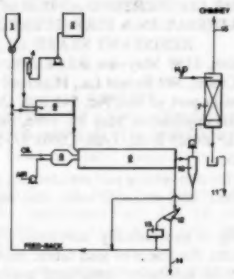
Sven-Eric Dahlgren, Landskrona; Douglas S. Ekman, Helsingborg, and Claes E. Eriesson, Bjuv, all of Sweden, assignors to Boliden Aktiebolag, Stockholm, Sweden

Filed Mar. 5, 1985, Ser. No. 708,396

Claims priority, application Sweden, Mar. 13, 1984, 8401400

Int. Cl.[4] C01B *25/26*

U.S. Cl. 426—74 **3 Claims**



1. A granular mineral feed product for animals consisting essentially of the reaction product between magnesium oxide and phosphoric acid, said granular product having neutral citrate solubility test relative value of at least about 95% and having a weight ratio of magnesium to phosphorus in the range of 1.5 to 1.8.

4,686,106

PECTIN FOOD PRODUCT

Robert M. Ehrlich, North Hollywood, and Raymond E. Cox, La Guna Hills, both of Calif., assignors to General Foods Corporation, White Plains, N.Y.

Filed Jun. 16, 1986, Ser. No. 874,944
Int. Cl.[4] A23L *1/06*
U.S. Cl. 426—577 7 Claims

1. A dry mix for jelly or jam preparation comprising coarse, sanding sugar particles and 0.05 to 0.15 percentage of an emulsifier selected from the class mono- and di-glycerides and triacetin and mixtures thereof uniformly spread across at least a portion of the sugar surfaces, the remainder of the ingredients comprising a food acid and dry pectin ground to have a particle size of less than 200 mesh and uniformly distributed throughout the sugar particles.

4,686,107

SWEETENER COMPOSITION AND METHOD

Garyx Zimmerman, 2005 Pinehurst Rd., Los Angeles, Calif. 90068, and Donald E. Dickenson, 960 Larrabee St., Los Angeles, Calif. 90069

Continuation-in-part of Ser. No. 730,479, May 6, 1985, Pat. No. 4,567,054. This application Jan. 27, 1986, Ser. No. 822,609
The portion of the term of this patent subsequent to Jan. 28, 2003, has been disclaimed.
Int. Cl.[4] A23L *1/22*
U.S. Cl. 426—548 12 Claims

1. A sweetener composition comprising a solution of from about 92 to about 98 wt. % glycerol, from about 0.5 to about 3.0 wt. % glycine, and from about 1.5 to about 5.0 wt. % gum arabic made by heating the ingredients of said solution at a temperature from about 90° to about 115° C.

4,686,108

CONDUCTIVE COATINGS FOR WOOD PRODUCTS

Dale L. Nason, Louisville, Ky., and Richard L. Gray, Columbus, Ohio, assignors to Reliance Universal, Inc., Louisville, Ky.

Filed Jul. 18, 1985, Ser. No. 756,288
Int. Cl.[4] B05D *1/04*
U.S. Cl. 427—27 9 Claims

1. A process for coating a wooden substrate comprising (a) applying to the substrate a nonaqueous, surfactant-free coating of a conductive polymeric material having a charge density of greater than about 2; (b) drying the conductive coating; and (c) applying a topcoat over the conductive coating by electrostatic spraying.

4,686,109

METHOD FOR CONVERTING AND MAINTAINING A FABRIC MATERIAL IN A FIRE RETARDANT, HEAT RESISTANT STATE

Arnold Z. Gordon, 5139 Mayview Rd., Lindherst, Ohio 44124, and Lyle A. Cohen, 380 Russet La., Highland Park, Ill. 60035

Continuation-in-part of Ser. No. 541,920, Oct. 14, 1983, abandoned. This application May 20, 1986, Ser. No. 865,096
Int. Cl.[4] B05D *3/02, 3/06;* C09D *5/16, 5/18*
U.S. Cl. 427—36 7 Claims

1. A method for converting and maintaining a fabric material in a fire retardant, heat resistent state, said method including the steps of;

A. integrating a substantially non-toxic hydrophilic substance amidst the fibers of said fabric material,

said hydrophilic substance integrated amidst said material fibers being operably possessed of reversible hydration characteristics towards the absorption of water in a non-heatfire environment and the alternative release of water in a heatfire environment,

said hydrophilic substance capable of releasing water in said heat-fire environment initiating at a temperature ranging from 150° F. to 300° F., towards safely retarding the dangers arising out of said heat-fire environment, without requiring exposure to substantially high temperatures in excess of 500° F. for initiation of said water release,

said substantially hydrophilic substance integrated amidst said fabric material fibers also being capable of reversibly hydrating with water to at least forty percent of the combined weight thereof;

said hydrophilic substance being further capable of being reversibly restored to a further fire retardant heatresistent state after said alternative release of water in said heat-fire environment, in the absence of damage and decomposure of the structure of said fabric material fibers;

B. hydrating said incorporated hydrophilic substance to said desired level of hydration, at equilibrium, through material hydration means.

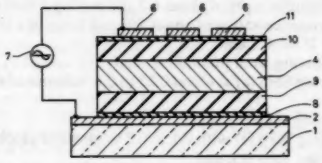
7. The method as set forth in claim 1 wherein said steps of integrating said fabric material is accomplished by chemically bonding said hydrophilic substance through irradiation with ionizing gamma rays.

4,686,110

METHOD FOR PREPARING A THIN-FILM ELECTROLUMINESCENT DISPLAY PANEL COMPRISING A THIN METAL OXIDE LAYER AND THICK DIELECTRIC LAYER

Yoshihiro Endo; Etsuo Mizukami; Hiroshi Kishishita, all of Nara, and Hisashi Uede, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 435,917, Oct. 22, 1982. This application Jan. 31, 1986, Ser. No. 824,861
Claims priority, application Japan, Oct. 22, 1981, 56-169616
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—38 7 Claims



1. A method for preparing a thin-film electroluminescent (EL) display panel comprising the steps of:

providing a first electrode on a surface of a transparent substrate;

providing a first insulating oxide layer on said first electrode;

forming a first dielectric layer on said first insulating oxide layer;

depositing an electroluminescent layer on said first dielectric layer;

forming a second dielectric layer on said electroluminescent layer by plasma chemical vapor deposition (CVD);

providing a second insulating oxide layer on said second dielectric layer; and

providing a second electrode on said second insulating oxide layer.

4,686,111

PASSIVATED AND LOW SCATTER ACOUSTIC WAVE DEVICES AND METHOD THEREOF

Frederick Y. Cho, Scottsdale, and Fred S. Hickernell, Phoenix, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

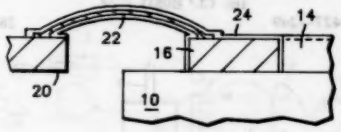
Division of Ser. No. 382,758, May 27, 1982, Pat. No. 4,450,374. This application Feb. 13, 1984, Ser. No. 579,916
Int. Cl.[4] B05D *5/12*
U.S. Cl. 427—38 1 Claim

1. A method of fabricating low-scatter surface acoustic wave devices comprising the steps of:

depositing a layer of an oxidizable metal of a first thickness on a substrate;

providing a protective coating on a first region of said layer, said first region comprising at least one interdigital transducer;

etching said layer of oxidizable metal to a second thickness less than said first thickness in a second region, said second



region comprising a plurality of gaps between fingers of said at least one inter-digital transducer;

completely oxidizing said layer of metal in said second region, whereby a layer of oxide is formed of approximately said first thickness; and

removing said protective coating from said layer of oxidizable metal in said first region.

4,686,112

DEPOSITION OF SILICON DIOXIDE

Dorothy M. Hoffman, Titusville, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Jan. 13, 1983, Ser. No. 457,578
Int. Cl.[4] B05D *3/06*
U.S. Cl. 427—42 **3 Claims**

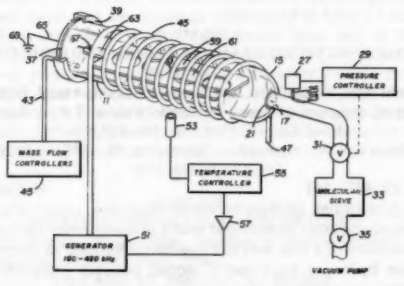
1. In a method of growing a layer of silicon dioxide on a substrate in a vacuum chamber by electron beam evaporation of a source of silicon at ambient temperature in the presence of oxygen, the improvement comprising passing said oxygen through water prior to introducing it into said chamber thereby also introducing water vapor into the chamber.

4,686,113

PLASMA CONFINEMENT IN A LOW PRESSURE ELECTRICALLY GROUNDED R.F. HEATED REACTOR AND DEPOSITION METHOD

Michelangelo Delfino, Los Altos, and Bruce R. Cairns, Los Altos Hills, both of Calif., assignors to Fairchild Semiconductor Corporation, Cupertino, Calif.

Filed Dec. 18, 1985, Ser. No. 810,954
Int. Cl.[4] B05D *3/02*
U.S. Cl. 427—45.1 **9 Claims**



1. A deposition reactor system for producing a coating containing a predetermined component on a substrate from a plasma containing such component in an ionized state, said reactor system comprising, means defining a reactor chamber, means for introducing a gas containing the predetermined component to said reactor chamber, susceptor means for supporting the substrate to be coated within said reactor chamber, induction heating means including coil means positioned for inductively coupling a radio frequency field to the gas for forming a plasma in said reactor chamber in the region of said susceptor means, and means for maintaining said susceptor means at ground potential in the radio frequency field.

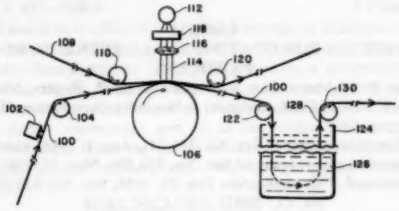
4. A method for operating a deposition reactor system for producing a coating containing a predetermined component on a substrate from a plasma containing such component in an ionized state, wherein the reactor system includes a reactor chamber, a susceptor for supporting the substrate to be coated within the reactor chamber, and an induction coil surrounding the susceptor for producing a radio frequency field for forming a plasma in the reactor chamber in the region of the susceptor, said method comprising, introducing a gas containing the predetermined component to the reactor chamber, inductively coupling a radio frequency magnetic field to the gas for forming a plasma in the reactor chamber in the region of the susceptor by energizing the coil with a radio frequency current, and maintaining the susceptor at ground potential in the radio frequency magnetic field.

4,686,114

SELECTIVE ELECTROLESS PLATING

Michael J. Halliwell, 4435 Willow Mist Dr., Dayton, Ohio 45424, and Joseph Zahavi, Technion Research & Development Foundation, Ltd., Israel Institute of Metals, Haifa, Technion City, Israel

Filed Jan. 17, 1986, Ser. No. 819,559
Int. Cl.[4] C23C *18/28*
U.S. Cl. 427—53.1 **15 Claims**



1. A method for selectively plating a metal onto a workpiece which comprises, in combination, the steps of applying a sensitizing solution to said workpiece, thereby providing a sensitized workpiece, directing a pulsed noncoherent optical energy source onto said workpiece in an area which is not to be plated whereby said said sensitizer is flash evaporated from said sensitized workpiece in said area, and thereafter contacting said workpiece with an electroless plating solution to achieve plating thereon.

4,686,115

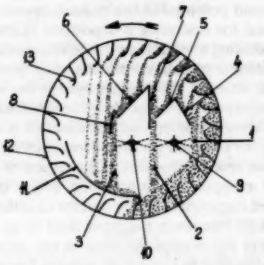
PROCESS FOR GRANULATING CHEMICAL PRODUCTS AND APPARATUS THEREFOR

Rocco Majer, Venezia, Italy, assignor to Fertimont S.p.A., Milan, Italy

Filed Jan. 15, 1986, Ser. No. 819,012
Claims priority, application Italy, Jan. 18, 1985, 19141 A/85
Int. Cl.[4] B05D *3/12, 7/00;* A23G *3/26;* B05B *17/00*
U.S. Cl. 427—212 **11 Claims**

1. A process for granulating urea, wherein a stream of recycled granules is introduced through the inlet of a rotary drum, is lifted by flights protruding from the inner surface of said drum, and falls onto a fixed inner structure causing the formation of a vertical curtain of granules onto which there is sprayed a concentrated aqueous solution or an aqueous suspension or a melt containing the urea to be granulated, whereby the granules become coated with a plurality of solid layers before leaving the outlet of the drum, and wherein said fixed

structure conveys the downfalling granules in at least two vertical curtains, parallel with each other and with the drum axis, characterized in that one portion of the granules, on the side of the downward movement of the drum, direcly falls, without touching any of said structures and without passing



through any vertical curtain, onto a fixed baffle, substantially arranged in the lower half of the drum on the side of the downward movement, such granules thus forming a descending bed of granules onto which at least one of the downfalling curtains falls.

4,686,116

PROCESS FOR COATING SMALL REFRACTORY PARTICLES

Steven F. Rickborn, San Jose, and Donald Z. Rogers, Menlo Park, both of Calif., assignors to Northrop Corporation, Hawthorne, Calif.

Continuation-in-part of Ser. No. 761,747, Aug. 1, 1985, which is a continuation-in-part of Ser. No. 672,396, Nov. 16, 1984, abandoned. This application Feb. 21, 1986, Ser. No. 831,602

Int. Cl.[4] B05D *7/00;* **C23C** *16/26*

U.S. Cl. 427—215 **11 Claims**

1. A chemical vapor deposition method for depositing a substantially uniform carbonaceous vapor deposited film on to substantially each of a plurality of small refractory particles, comprising:

intimately intermixing a plurality of uncoated small refractory particles with an organic precursor in liquid or solid form, the intermixing being at a temperature below the sublimation, boiling or decomposition temperature of the organic precursor; and

subjecting the intimate intermixture of particles and precursor to a temperature which falls within a range from about 700° C. to about 1200° C. in a deposition zone which is maintained substantially oxygen-free, the residence time in the deposition zone being restricted to be less than that which would deleteriously effect the properties of the particles having the vapor deposited film thereon, the organic precursor, under the residence time and temperature conditions in the deposition zone, being selected to be substantially completely converted, by at least one of sublimation, boiling and decomposition, to one or more vaporous species in said deposition zone and being selected to either (1) sublime or boil at a temperature in excess of about 400° C. or (2) to not decompose at a temperture below about 300° C. if said organic precursor decomposes at a temperature below its sublimation or boiling temperature, to form said one or more vaporous species.

4,686,117

METHOD OF FORMING A CARBIDE LAYER

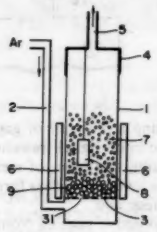
Tohru Arai, Toyoake, and Junji Endo, Nagoya, both of Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Continuation of Ser. No. 733,843, May 14, 1985, abandoned. This application Sep. 30, 1986, Ser. No. 913,643

Claims priority, application Japan, May 17, 1984, 59-98993; Jun. 4, 1984, 59-114034

Int. Cl.[4] B05D *7/24*

U.S. Cl. 427—249 **26 Claims**



1. A method of using a fluidized bed to form a carbide layer on the surface of a carbon-containing article, which comprises the steps of:

(a) disposing the article and a coating agent in a fluidized bed furnace,

(b) introducing a fluidizing gas into the furnace under heat to fluidize the coating agent, and

(c) heating the coating agent to a treating temperature in the range of from 700° to 1200° C.

said coating agent comprising:

a fluidizable refractory powder,

a carbide-forming powder composed of at least one carbide-forming metal or alloy and

a halide powder composed of at least one of a halogenated ammonium salt and a metal halide which is sublimable or vaporizable at a temperature which is not in excess of the treating temperature.

4,686,118

RECORDING MEDIUM AND RECORDING METHOD BY USE THEREOF

Ryuichi Arai, Sagamihara, and Mamoru Sakaki, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 23, 1986, Ser. No. 824,574

Claims priority, application Japan, Jan. 28, 1985, 60-012603

Int. Cl.[4] B41M *5/00*

U.S. Cl. 427—261 **16 Claims**

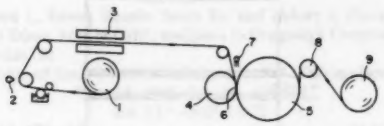
1. A recording medium for ink jet recording, comprising an ink receiving layer including at least a predetermined thickness of a mixture of a first polymer capable of forming an intermolecular hydrogen bond and a second polymer incapable of forming an intermolecular hydrogen bond, at a preselected weight ratio of the first polymer to the second polymer ranging from 4:1 to 1:4, said ink receiving layer being provided on a light-transmissive substrate, wherein the thickness of the mixture and the preselected weight ratio provide the recording medium with a linear light transmittance of not less than 77%.

4,686,119

METHOD OF PRODUCING CAST COATED PAPER

Kazuhiro Nojima, Kobe; Kouichi Shono, Amagasaki, and Mikio Takahashi, Takatsuki, all of Japan, assignors to Kanzaki Paper Mfg. Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1986, Ser. No. 832,477
Claims priority, application Japan, Feb. 25, 1985, 60-35698
Int. Cl.[4] B05D *3/12*
U.S. Cl. 427—362 7 Claims



1. In a method of producing cast coated paper in which a rewetted or gelled coating layer containing as its main components pigment and adhesive is pressed at a linear pressure of above 120 kg/cm against a highly polished finishing surface of a drum having a surface temperature of above 90° C., the improvement characterized in that said coating layer and/or a rewetting liquid or a gelling liquid for said coating layer contains at least one releasing agent selected from the group consisting of lecithin and synthetic phosphatidyl choline derivatives, the amount of said releasing agent present being sufficient to effect release of said cast coated paper from said finishing surface without adversely affecting the quality of said finished cast coated paper.

4,686,120

MULTILAYER CATION EXCHANGE MEMBRANE

Bruce B. Johnson, Wallingford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 704,530, Feb. 22, 1985, Pat. No. 4,604,323.
This application Apr. 28, 1986, Ser. No. 856,391
Int. Cl.[4] B05D *3/12, 3/02;* B32B *27/00*
U.S. Cl. 427—370 1 Claim

1. A process for preparing a cation exchange membrane from fluorinated polymers having sulfonic or carboxylic ion exchange groups and having at least one fluorine atom on a carbon atom adjacent to each ion exchange group, said membrane having three adhered layers which are, in turn,

(a) a first layer consisting essentially of fluorinated polymer having sulfonic ion exchange groups,

(b) a second layer adhered to the first layer consisting essentially of fluorinated polymer having carboxylic ion exchange groups, and

(c) a third layer adhered to the second layer, having a thickness of less than 25 microns and consisting essentially of fluorinated polymer with carboxylic ion exchange groups and having an ion exchange capacity of at least 0.1 milliquivalent/gram of dry resin greater than that of the fluorinated polymer of the second layer.

which process comprises coating, onto layer (b) of a two-layer membrane of layers (a) an (b), a solution or non-aqueous dispersion of the polymer used in layer (c), drying said coating and hot pressing the resulting membrane to adhere layer (c) to layer (b).

4,686,121

TREATING APPARATUS AND METHOD

Lyle H. Rogalla, Hugo, Minn., assignor to Environmental Air Contractors, Inc., St. Paul, Minn.

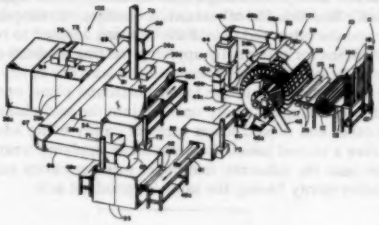
Filed Mar. 17, 1986, Ser. No. 840,062
Int. Cl.[4] B05C *3/00;* B05D *1/18, 3/02;* F26B *19/00*
U.S. Cl. 427—378 23 Claims

15. The inline method of coating and drying in one continuous process a wood article comprising the steps of:

applying a coating solution to the exterior surfaces of an article to produce a coated article by completely immersing the article in a dipping tank until the surfaces of the article are coated with the coating solution;

removing the coated article from the coating solution;

blowing off excess coating solution from the exterior surfaces of the article;



conveying the coated article to a drying apparatus and forcing heated air around the exterior surfaces of the coated article to dry the exterior surface of the article for immediate processing.

4,686,122

RUBBER ADHESIVE

Tadanobu Iwasa, and Hiroshi Yokoi, both of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Continuation of Ser. No. 746,545, Jun. 19, 1985, abandoned.
This application Aug. 18, 1986, Ser. No. 896,578
Claims priority, application Japan, Jun. 25, 1984, 59-130623
Int. Cl.[4] B32B *15/04;* B05D *3/02*
U.S. Cl. 427—388.3 2 Claims

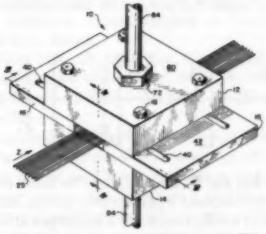
1. A metal base adhered to a rubber through an adhesive, the improvement residing in using (1) as the first coating, a phenolic resin—based primer; (2) as the adhesive, a composition consisting of 100 parts by weight of a chlorinated ethylene propylene rubber and from 4 to 16 parts by weight of a C_{2-4} nickel dithio—carbamate; and (3) as the rubber adherend, a rubber selected from the group consisting of butyl rubber, chlorinated butyl rubber, and ethylene—propylene—diene rubber.

4,686,123

TURBULENT FLOW LIQUID APPLICATION APPARATUS AND A METHOD OF TURBULENTLY APPLYING A LIQUID ONTO A SUBSTRATE

Chris D. Levan, Brunswick, Ohio, assignor to Amoco Corporation, Chicago, Ill.

Filed Jan. 30, 1986, Ser. No. 824,066
Int. Cl.[4] B05D *1/02*
U.S. Cl. 427—424 7 Claims



1. An apparatus for treating a moving substrate with a treating medium comprising an upper member, a lower member and two side plates; said upper and lower members and two side plates forming a chamber through which the moving

substrate and a treating medium pass; said upper member extending upward from an upper horizontal plane; said lower member extending downward from a lower horizontal plane; said planes being parallelly spaced apart by a distance equal to the height of the two side plates, said height being in the range of from about 0.05 to 1.0 inch; said upper member having at least one cavity extending perpendicularly to the upper horizontal plane, one end of said cavity opening into the said chamber and the other end of said cavity being adapted to receive a first means for turbulently applying treating medium onto the substrate; said lower member having at least one cavity extending perpendicularly to the lower horizontal plane, one end of said lower member cavity opening into the said chamber and the other end of said lower member cavity being adapted to receive a second means for turbulently applying treating medium onto the substrate; said upper member cavity and lower member cavity having the same longitudinal axis.

4,686,124

THERMOPLASTIC RESIN-SILICONE RUBBER COMPOSITE SHAPED ARTICLE

Masayuki Onohara, Kanagawa; Kenji Kawai, Yokohama; Masaru Shibata, Kanagawa; Akira Igarashi, Yokohama, and Nobuhisa Kawaguchi, Kamakura, all of Japan, assignors to Sumitomo Bakelite Company Ltd. and Fuji Systems Corporation, both of Tokyo, Japan

Filed Nov. 29, 1984, Ser. No. 675,997

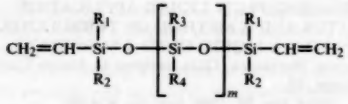
Claims priority, application Japan, Dec. 12, 1983, 58-232809; Dec. 26, 1983, 58-244187; Feb. 24, 1984, 59-32607; Feb. 24, 1984, 59-32608; Feb. 24, 1984, 59-32609; Mar. 6, 1984, 59-41457; Mar. 26, 1984, 59-56254

The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.

Int. Cl.[4] B32B *1/00, 27/08, 27/40;* **A61M** *5/00*

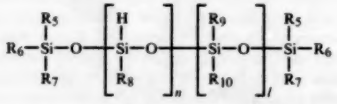
U.S. Cl. 428—35 **12 Claims**

1. A thermoplastic resin-silicone rubber composite shaped article comprising (a) a shaped article of a thermoplastic resin selected from the group consisting of soft vinyl chloride resins, olefin resins, urethane resins and styrene resins and (b) a cured layer or cured layers of an addition polymerization type silicone rubber composition bonded to one side or both sides of said shaped article, said silicone rubber composition consisting of (a) a polysiloxane having vinyl groups represented by the formula (5),



(5)

wherein R_1, R_2, R_3 and R_4 may be same or different and are each a monovalent hydrocarbon group having 6 or fewer carbon atoms and m is a positive integer, (b) an organohydrogenpolysiloxane represented by the formula (6),



(6)

wherein R_5, R_7, R_8, R_9 and R_{10} may be same or different and are each a monovalent hydrocarbon group having 6 or less carbon atoms, two R_6's each are a hydrogen atom or a same or different monovalent hydrocarbon group having 3 or less carbon atoms, n is an integer of 2 to 100 and l is an integer of 0 to 100, and (c) an inorganic substance as a reinforcing component, and the silicone rubber composition being able to be converted into a solid elastomer when subjected to addition polymerization in the presence of a platinum type catalyst.

4,686,125

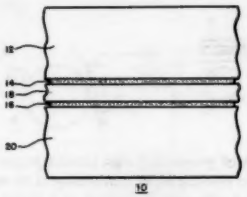
FILM LAMINATE FOR STERILE FLEXIBLE CONTAINERS

William D. Johnston, Buffalo Grove; Leonard Czuba, Lombard, and R. D. Webster, Barrington, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Sep. 28, 1984, Ser. No. 655,491

Int. Cl.[4] B65D *30/08;* **A61B** *19/00;* **B32B** *27/00*

U.S. Cl. 428—35 **32 Claims**



1. A laminate film structure having sufficient flexibility, strength, heat sealability, and slip properties for producing on a packaging machine a flexible container for containing a liquid to be administered into a patient's body comprising:

a layer of a linear low density polyethylene for forming an outside layer of the flexible container;

a layer of biaxially oriented nylon for forming a core layer of the flexible container;

a layer of a linear low density polyethylene for forming an inside layer of the flexible container; and

the outside layer and inside layer being bonded to the core layer by separate layers of polyurethane adhesive.

4,686,126

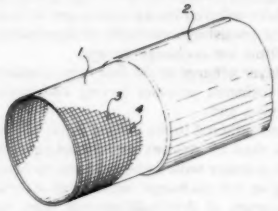
TUBULAR LINING MATERIAL FOR CITY WATER PIPE LINES

Masakatsu Hyodo; Koji Kusumoto, and Takuji Sokawa, all of Osaka, Japan, assignors to Ashimori Industry Co., Ltd., Osaka, Japan

Filed Oct. 18, 1985, Ser. No. 788,945

Int. Cl.[4] F16L *55/18, 57/00*

U.S. Cl. 428—36 **7 Claims**



1. A tubular lining material for city water pipe lines, applicable onto the inner surface of a city water pipe line in such manner that the tubular lining material with a binder on the inner surface thereof is inserted into the pipe line and allowed to advance within the pipe line while turning the tubular lining material inside out under fluid pressure thereby applying the tubular lining material onto the inner surface of the pipe line with the binder being interposed between the pipe line and the tubular lining material, which comprises a textile jacket made of warps and a weft woven in a tubular fabric structure form overlaid with a fluid-impervious coat of a flexible synthetic resin, at least one of the warps and the weft of said textile jacket being comprised of threads of intertwined filament yarns with spun yarns and/or spun-like textured yarns of synthetic fibers, said flexible synthetic resin comprising a blend of 60–40% of a polyethylene resin and 40–60% of a styrene-ethylene-butylene-styrene resin having a stress-crack resistance of at least 1000 hours, said flexible synthetic resin being present in

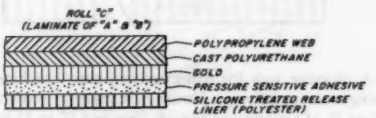
the interstices of said fabric structure of said tubular textile jacket.

4,686,127

PELLICULAR LAMINATE MEANS FOR SHIELDING STRUCTURES FROM ELECTROMAGNETIC RADIATION

Richard L. Burns, Rancho Santa Fe, and Robert J. Petcavich, San Diego, both of Calif., assignors to Brunswick Corporation, Skokie, Ill.

Division of Ser. No. 609,474, May 11, 1984. This application Mar. 15, 1985, Ser. No. 695,564
Int. Cl.[4] A61F *13/02*
U.S. Cl. 428—40 **11 Claims**



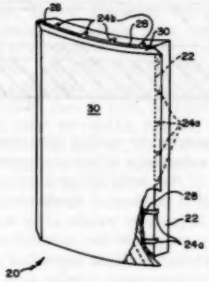
1. A pellicular laminate comprising a carrier web of a polyolefin; a continuous coating of polyurethane on a surface of said web; a conductive layer consisting essentially of metal sputter-deposited on the exposed surface of the polyurethane coating; a coating of pressure-sensitive adhesive on said metal surface; and a silicone-coated film covering said adhesive layer.

4,686,128

LASER HARDENED MISSILE CASING

Richard L. Gentilman, Acton, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Jul. 1, 1985, Ser. No. 750,944
Int. Cl.[4] B32B *3/30*
U.S. Cl. 428—44 **20 Claims**



1. A thermal protective covering for a casing of a structural element, comprising:

a thermally ablating layer;

a rigid, nonporous thermally insulating layer comprising a high modulus fiber incorporated in a thermally insulating matrix bonded between the casing of the structural element and the thermally ablating layer;

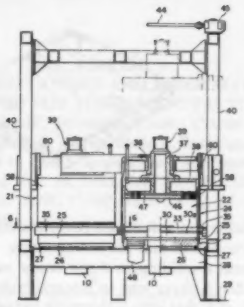
means for venting pyrolysis gases comprising, a plurality of grooves disposed in a surface of a first one of said ablating layer and thermally insulating layer with said surface being bonded to the second one of said ablating layer and thermal insulating layer, said grooves terminating at edge portions of said first layer.

4,686,129

MOLD CLAMPING MECHANISM FOR TIRE CURING MACHINES

Kageki Yokoyama, and Itaru Amano, both of Kobe, Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Continuation of Ser. No. 572,254, Jan. 20, 1984, Pat. No. 4,563,139. This application Aug. 16, 1985, Ser. No. 766,356
Claims priority, application Japan, Jan. 27, 1983, 58-12334
Int. Cl.[4] B29H *5/02*
U.S. Cl. 425—47 **8 Claims**



1. A mold clamping apparatus for a tire curing press, comprising:

a press base;

a platen support fixed to said press base;

a lower mold cavity positioned above said press base and surrounding said platen support;

a lower mold positioned above said platen support;

an upper mold cavity having an upper mold position therein and opposingly mounted to said lower mold cavity and vertically movable toward and away from said lower mold cavity;

a center mechanism provided at the center of said upper and lower mold cavities, respectively;

lock means for releasably locking said upper and lower mold cavities to each other;

mold pressing means located beneath and connected to said lower mold cavity, said mold press means being further connected to said upper mold cavity via said lock means for simultaneously pressing said lower and upper mold cavity downwardly; and

means for supporting said lower mold cavity on said press base and which allows for movement of said lower mold cavity.

4,686,130

TRIM COVER ASSEMBLY FOR VEHICLE SEATS

Shigeki Kon, Akishima, Japan, assignor to Tachikawa Spring Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1986, Ser. No. 841,100
Claims priority, application Japan, Mar. 30, 1985, 60-67651
Int. Cl.[4] A47C *7/02*; B32B *31/00*
U.S. Cl. 428—71 **6 Claims**

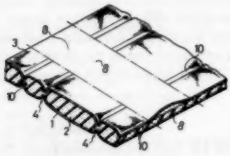
1. A trim cover assembly for a vehicle seat comprising a lamination of a top cover member, a wadding of foam material and a wadding cover, said lamination being welded by means of high frequency waves so as to form a plurality of longitudinal welds with recessed-groove-like welder stitches on a top surface thereof, said trim cover being adapted to cover a curved cushion member, wherein the portion of each of said welds of said trim cover assembly adapted to cover the curved portion of the cushion member includes at least one non-welded portion extending in a direction perpendicularly to the longitudinal direction of said welds; said non-welded portions

being between at least one of said wadding and said wadding cover and said wadding and said top cover member.

4. A method of manufacturing a trim cover assembly provided with a non-welded portion, comprising the steps of:

sequentially placing a top cover member, a wadding, and a wadding cover onto a welder mold having a plurality of projecting strips for welding thereon;

interposing a strip-shaped insulation member between at least one of said wadding and said wadding cover and said wadding and said top cover member; said insulation member extending in a direction perpendicular to the longitudinal direction of said projecting strips;



high-frequency welding said top cover member, wadding and wadding cover into an integral body so as to form a plurality of welds with welder stitches on a top surface of said top cover member; and

removing said insulation member to form said non-welded portion between at least one of said wadding and said wadding cover and said wadding and said top cover member.

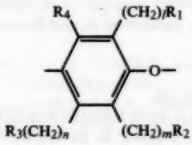
4,686,131

SILYLATED POLYPHENYLENE ETHER MEMBRANE FOR GAS SEPARATION

Akitoshi Sugio, Saitama; Masao Okabe, Chiba; Masamichi Mizukami, and Yoshihiko Sekine, both of Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Apr. 11, 1985, Ser. No. 721,966
Claims priority, application Japan, Apr. 11, 1984, 59-72107
Int. Cl.[4] C08G *65/48;* B01D *53/22*
U.S. Cl. 428—158 **13 Claims**

1. A membrane for gas separation which comprises a silylated polyphenylene ether having a constituting unit containing an organo-silane group represented by the formula (I):



(I)

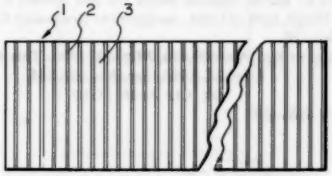
wherein R_1, R_2, R_3 and R_4 each represents a hydrogen atom or a group of the formula $-Si(R_5)(R_6)(R_7)$, wherein R_5, R_6, and R_7 each represents an alkyl group; l and n each represents 0 or an integer of from 1 to 3; and m represents an integer of from 1 to 3; with the proviso that R_1, R_2, R_3 and R_4 do not simultaneously represent hydrogen atoms, wherein the silylated polyphenylene ether is prepared by reacting a polyphenylene ether with from 0.3 to 3.0 molar equivalent of an alkali metal-adding agent per repeating unit of the polyphenylene ether, at a temperature of from about −80° C. to about 80° C., to form an alkali metal-added polyphenylene ether and reacting the resulting alkali metal-added polyphenylene ether with a slight molar excess of a monohalogenated silane per mole of the alkali metal-adding agent, at a temperature of from about −80° C. to about 80° C.

4,686,132

CLEANING WEB FOR FIXING ROLLS ON COPY MACHINES

Yoshiyuki Sumii, Moriyama, and Soshichi Fukaya, Hikone, both of Japan, assignors to Japan Vilene Co., Ltd., Tokyo, Japan

Filed Apr. 2, 1985, Ser. No. 719,012
Int. Cl.[4] B32B *5/14*
U.S. Cl. 428—171 **11 Claims**



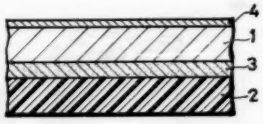
1. A cleaning web for fixing rolls of copy machines, said cleaning web comprising a fibrous base material containing 20 to 85 wt % of aromatic polyamide fibre and 80 to 15 wt % of polyester fibre and having an embossed pattern with (a) sealed portions and (b) non-sealed portions with an apparent density of 0.2 to 0.4 g/cm^3 distributed substantially over the entire area thereof, the fibrous base material being impregnated with 25-55 g/m^2 silicone oil.

4,686,133

CLOSURE MATERIAL FOR SEALING GLASS CONTAINERS

Masamitsu Nakabayashi, Osaka; Hideo Kawai, Sakai; Suminori Tatsukawa, and Masayuki Kaji, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd. and Showa Aluminum Corporation, both of Osaka, Japan

Filed Feb. 22, 1985, Ser. No. 704,241
Claims priority, application Japan, Feb. 24, 1984, 59-34873
Int. Cl.[4] B32B *15/08, 27/00*
U.S. Cl. 428—209 **14 Claims**



1. A closure material for sealing glass containers comprising a metal foil and a thermally adhesive composition layer formed on one surface of the metal foil and comprising a carboxyl-modified saponified product of ethylenevinyl acetate copolymer and 0.1 to 30 parts by weight of an inorganic compound per 100 parts by weight of the carboxyl-modified saponified product, the carboxyl-modified saponified product being prepared by graft-polymerizing acrylic acid with a saponified product of ethylene-vinyl acetate copolymer containing 50 to 97 mole % of ethylene and having a melt index of 1 to 300g/10 minutes.

4,686,134

THREE-DIMENSIONAL STRUCTURAL MEMBER

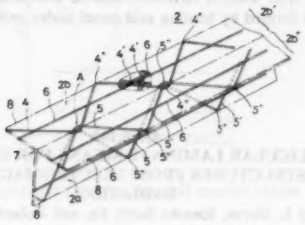
Kohtaro Ono, Fukui, Japan, assignor to Nippon Mayer Co., Ltd., Fukui, Japan

Filed Dec. 23, 1985, Ser. No. 812,439
Claims priority, application Japan, Dec. 29, 1984, 59-281061
Int. Cl.[4] D03D *13/00*
U.S. Cl. 428—222 **27 Claims**

1. A three-dimensional structural member comprising a

plurality of planar structural sections intersecting to form a cross section having a plurality of legs, each leg corresponding to a respective one of said planar structural sections, said plurality of planar structural sections forming a reinforcing substrate fabric serving as a core material for said structural member, and a shape retention agent solidified around said reinforcing substrate fabric,

said reinforcing substrate fabric comprising a plurality of fabric areas, each fabric area constituting one of said planar structural sections, said fabric areas being integrally formed by braiding means, each said fabric area comprising at least first and second groups of yarns, the first group of yarns being arrayed straight in a longitudinal



direction of said three-dimensional structural member, the second group of yarns a plurality of times extending in each said fabric area widthwise or obliquely with respect to the longitudinal direction of said structural member, turning at one widthwise end of each said fabric area, returning widthwise or obliquely, reaching a boundary with another fabric area, interlacing at said boundary with yarns of said another fabric area, and further extending towards another widthwise end of said each fabric area, whereby said yarns of said second group are ultimately arrayed substantially in a lengthwise direction in said each fabric area and are interlaced with said first group of yarns.

4,686,135

COMPOSITE SHEET MATERIAL

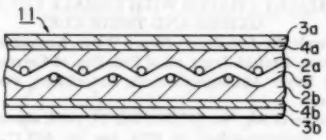
Tsutomu Obayashi, Tokyo; Kazuhide Ino, Souka; Yoshiji Hiraoka, Musashino, and Saburo Baba, Nagareyama, all of Japan, assignors to Hiraoka & Co., Ltd., Tokyo, Japan

Filed Nov. 14, 1985, Ser. No. 798,112

Claims priority, application Japan, Jan. 29, 1985, 60-13445; Feb. 14, 1985, 60-25240; Jun. 4, 1985, 60-119671; Jun. 4, 1985, 60-119672; Jun. 28, 1985, 60-140412; Jun. 29, 1985, 60-141523; Aug. 12, 1985, 60-175655; Aug. 12, 1985, 60-175656; Aug. 12, 1985, 60-175657; Aug. 17, 1985, 60-180039; Aug. 20, 1985, 60-181076; Aug. 28, 1985, 60-187178

Int. Cl.[4] B32B *7/00;* **C09J** *5/02*

U.S. Cl. 428—265 **20 Claims**



1. A composite sheet material comprising:

(a) at least one silicone polymer layer containing at least one member selected from the group consisting of silicone resins and silicone rubbers, and

(b) at least one stainproof surface layer containing at least one synthetic thermoplastic polymeric material having high stain-resistance and weathering resistance, and characterized in that the silicone polymer layer has a surface portion thereof modified by means of a graft polymerization treatment with at least one member selected from the group consisting of acrylic acid, acrylamide, and ethylene imine and the silicone polymer layer is bonded to the stainproof surface layer at and through the resultant graft polymerization-modified surface portion.

4,686,136

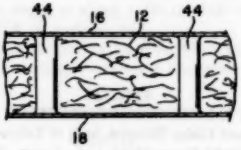
LAMINATED FABRICS AND FIBER MATS AND METHOD FOR THEIR MANUFACTURE

Edward C. Homonoff, Brooklyn, Conn.; Clarke A. Rodman, East Providence, R.I., and Broaddus L. Rutledge, II, Clemson, S.C., assignors to Allied Corporation, Morristown, N.J.

Filed Nov. 18, 1985, Ser. No. 799,063

Int. Cl.[4] B29C *65/08;* **B32B** *27/02, 31/20*

U.S. Cl. 428—286 **15 Claims**



1. A laminated fabric material comprising an outer shell fabric layer, an inner shell fabric layer, said inner and outer shell fabric layers including a heat fusible material, and an inner layer disposed between said inner and outer shell fabric layers, said inner layer comprising a nonwoven batt containing a mixture of fibers which are thermoplastic and fibers which are not thermoplastic, said batt including spaced-apart portions in which the thermoplastic fibers are fused together to form a structural component extending through the batt, the ends of said structural components being fused with the inner and outer shell fabric layers respectively while leaving the thermoplastic fibers in said batt between said structural components unfused so that the nonthermoplastic fibers between said structural components are not altered, whereby said structural components define column means interconnecting said shell fabric layers and maintaining said shell fabrics apart to substantially prevent compression of said shell fabrics into said batt in regions adjacent to said columns.

10. Method of forming a laminated fabric material from a batt and thermoplastic shell fabric layers on opposite sides of the batt comprising the steps of preparing a nonwoven batt containing a mixture of a thermoplastic material and a material which is not thermoplastic, progressively feeding said batt in a given direction, feeding said shell fabrics in said given direction in juxtaposition to opposite sides of said batt, and heating only spaced-apart portions of said batt as it is fed in said given direction to a temperature sufficient to fuse together the thermoplastic fibers in said batt at said spaced-apart portions and to join said thermoplastic fibers at said spaced-apart portions to said shell fabrics to thereby form a structural component extending through said batt to join said shell fabrics with the spaced-apart portions of the batt, and maintain the rest of said batt other than said spaced-apart portions at a temperature less than the temperature at which said thermoplastic fibers fuse, said structural components being caused to form in sufficient quantity and size to prevent substantial compression of said shell fabrics into said batt in regions adjacent said structural components.

4,686,137

MOISTURE VAPOR PERMEABLE MATERIALS

Robert S. Ward, Jr., Lafayette, and Judy S. Riffle, Oakland, both of Calif., assignors to Thoratec Laboratories Corp., Berkeley, Calif.

Continuation-in-part of Ser. No. 507,517, Jun. 24, 1983, which is a continuation-in-part of Ser. No. 385,813, Jun. 7, 1982, abandoned, and a continuation-in-part of Ser. No. 472,189, Mar. 4, 1983, abandoned, which is a continuation-in-part of Ser. No. 385,813, which is a continuation of Ser. No. 278,664, Jun. 29, 1981, abandoned, which is a continuation of Ser. No. 125,845, Feb. 29, 1980, abandoned. This application May 21, 1984, Ser. No. 612,365

Int. Cl.[4] B32B *27/00*

U.S. Cl. 428—290 **6 Claims**

1. A coated textile impermeable to liquid water characterized by high moixture vapor transmission comprising a fabric web and a uniform nonporous coating on at least one surface of said web, said coating comprising a segmented block multipolymer comprising an essentially linear segmented copolymer chain characterized by at least one polyurethane or polyurethane urea hard segment and a soft block copolymer comprising at least one hydrophilic soft block and at least one hydrophobic soft block.

4,686,138

DIRECT IMAGE OFFSET PRINTING PLATES

Koji Toyama, and Hideo Shimizu, both of Tokyo, Japan, assignors to Mitsubishi Paper Mills, Ltd., Tokyo, Japan

Filed Jun. 11, 1986, Ser. No. 872,875

Claims priority, application Japan, Jun. 13, 1985, 60-129462; Jun. 18, 1985, 60-133873

Int. Cl.[4] G11B *5/62*

U.S. Cl. 428—323 **11 Claims**

2. A direct image printing plate for offset printing which comprises a water resistant support and an image receiving layer provided thereon which comprises a mixed pigment comprising a synthetic silica fine powder of 20μ or less in particle diameter and a colloidal silica of 50 mμ or less in particle diameter and a binder.

4,686,139

MAGNETIC RECORDING MEDIUM

Katsumi Ryoke; Nobutaka Yamaguchi; Masatoshi Takahashi; Kazuko Hanai; Hideaki Kosha, and Eiichi Tadokoro, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 20, 1985, Ser. No. 778,468

Claims priority, application Japan, Sep. 20, 1984, 59-195688

Int. Cl.[4] G11B *5/68, 5/708*

U.S. Cl. 428—323 **8 Claims**

1. A magnetic recording medium comprising a non-magnetic support having a magnetic layer and a backing layer which is provided on the surface of the support opposite to the magnetic layer, the backing layer containing (a) non-magnetic particles comprising carbon black having an average particle diameter of 0.15 to 1.0 μm, (b) a binder comprising (i) a resin having 150 kg/cm^2 or less of modulus of elasticity in an amount of at least 50 wt% based on the total amount of binder, and (ii) a diphenyl methane diisocyanage hardening agent, with the amount of non-magnetic particles to total binder contained in the backing layer being 40 to 300 parts by weight of non-magnetic particles per 100 parts by weight of binder, wherein the diphenyl methane diisocyanate harding agent is present in an amount of 5 to 40 wt% based on the total amount of binder.

4,686,140

WOOD VENEER PANELS BONDED WITH CELLULOSE SOLVENTS

Linda F. Lorenz, Middleton, Wis., assignor to The United States of America as represented by the Secretary of the Agriculture, Washington, D.C.

Filed Nov. 29, 1985, Ser. No. 802,902

Int. Cl.[4] B32B *21/06;* **B05D** *3/04*

U.S. Cl. 428—342 **3 Claims**

1. A bonded wood veneer panel of (ply) plies characterized by high dry shear strengths comprising at least 2 ply of veneer (having a bond comprising cellulose solvents) bonded with an adhesive selected from the group consisting of (aqueous solutions of) a cupriethylenediamine hydroxide-cellulosic complex and an iron sodium tartrate-cellulosic complex, wherein the bond is formed by heating said panel under pressure.

4,686,141

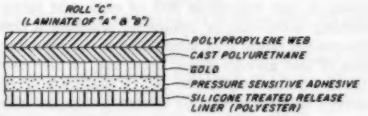
PELLICULAR LAMINATE MEANS FOR SHIELDING STRUCTURES FROM ELECTROMAGNETIC RADIATION

Richard L. Burns, Rancho Santa Fe, and Robert J. Petcavich, San Diego, both of Calif., assignors to Brunswick Corporation, Skokie, Ill.

Filed May 11, 1984, Ser. No. 609,474

Int. Cl.[4] B32B *15/00*

U.S. Cl. 428—344 **8 Claims**



1. Strips or sheets of pellicular laminate for covering the surface of, and shielding, an aircraft, and instrument containers therein, from electromagnetic radiation, and adapted to expand and contract with the expansion and contraction of the surface of said aircraft and said instrument containers without separating therefrom as the aircraft moves through the atmosphere and is subjected to mechanical, aerodynamic, and temperature variations, said laminate being composed of a pellicule of polyurethane which has a coating consisting essentially of ductile metal sputter-deposited thereon, and a coating of pressure-sensitive adhesive on the surface of said metal.

4,686,142

PROCESS FOR THE PRODUCTION OF IRON OXIDES EPITAXIALLY COATED WITH COBALT THE COATED OXIDES AND THEIR CUE

Peter Kiemle, Krefeld-Traar; Jürgen Wiese, Krefeld, and Gunter Buxbaum, Krefeld-Traar, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 517,792, Jul. 27, 1983, abandoned. This application Sep. 20, 1984, Ser. No. 652,214

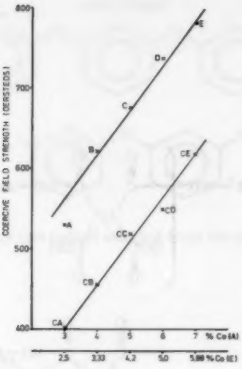
Claims priority, application Fed. Rep. of Germany, Jul. 31, 1982, 3228659

Int. Cl.[4] H01F *10/02*

U.S. Cl. 428—403 **11 Claims**

1. A process for the production of magnetic iron oxides epitaxially coated with cobalt and having increased coercive field strength, comprising subjecting the magnetic iron oxides

to be coated to an acid treatment before coating, said acid treatment resulting in a weight loss of iron oxides of from 2 to



30%, and then epitaxially coating the acid treated oxides with cobalt.

4,686,143

OPTICAL INFORMATION RECORDING MEDIUM

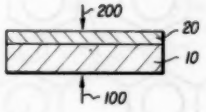
Tadao Yoshikawa, and Shiro Nagata, both of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Dec. 30, 1985, Ser. No. 814,501

Claims priority, application Japan, Dec. 28, 1984, 59-276389; Jan. 4, 1985, 60-69828; Mar. 25, 1985, 60-61418

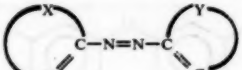
Int. Cl.[4] B32B 9/04; G01D 9/00

U.S. Cl. 428—411.1 **29 Claims**



1. An optical information recording medium which is adapted for the recording and reading out of information by means of laser light, comprising:

a substrate and a recording layer, said recording layer containing a metal complex of a monoazo compound of the formula:



wherein X is a residue which, taken together with the adjacent nitrogen atom and carbon atom, forms a heterocyclic ring; Y is a residue which, taken together with two adjacent carbon atoms, forms an aromatic ring; and Z is hydroxy or carboxy.

4,686,144

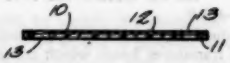
HIGH PERFORMANCE PRINTABLE COATINGS FOR IDENTIFICATION DEVICES

Bruce A. Hupfer, Hartford, and James F. Hubert, Wauwatosa, both of Wis., assignors to W. H. Brady Co., Milwaukee, Wis.

Filed Feb. 21, 1986, Ser. No. 831,674

Int. Cl.[4] B32B 15/08, 27/00, 27/08

U.S. Cl. 428—421 **3 Claims**



1. In an identification device comprising a substrate and a printable coating adherent to a surface thereof, the printable coating including a polymeric film-forming binder and ink-absorbent solid particulates distributed in the binder,

the improvement wherein:

the printable coating is applied to the substrate as a solution in which the polymeric film-forming binder is a combination of (i) a polyimide having an average molecular weight in the range of about 10,000 to 50,000 and (ii) a fluorocarbon elastomer having an average molecular weight in the range of about 1,000 to 5,000 and which is soluble in MEK or acetone, and

the weight ratio of the polyimide to the fluorocarbon elastomer when the coating is dried is in the range of about 2:1 to 3:1.

4,686,145

MAGNETIC RECORDING MEDIUM, A PROCESS FOR PREPARING A MAGNETIC RECORDING MEDIUM AND A BINDER COMPOSITION THEREFOR

Masaru Honda; Takanori Chiba; Toshiaki Imokawa, all of Niihama; Yoshito Harada, Takarazuka, and Katsumi Nagayasu, Amagasaki, all of Japan, assignors to Sumitomo Bayer Urethane Co., Ltd., Amagasaki, Japan

Filed Feb. 19, 1986, Ser. No. 830,763

Claims priority, application Japan, Mar. 1, 1985, 60-40792; Mar. 1, 1985, 60-40793

Int. Cl.[4] G11B 5/702

U.S. Cl. 428—425.9 **3 Claims**

1. A binder composition comprising a polyurethane resin obtained by reacting

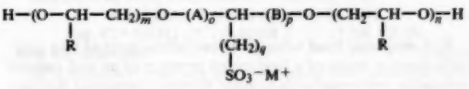
(a) a polyisocyanate component with

(b) a polyol component comprising

(i) a hexane diol-(1,6)-polycarbonate having terminal hydroxyl groups and having a molecular weight of from 400 to 10,000,

(ii) a sulfonate-free diol chain extender which has a molecular weight of from 62 to 399, and

(iii) a diol containing chemically bonded sulphonate groups of the formula



wherein

A and B are the same or different divalent aliphatic hydrocarbon radicals having from 1 to 6 carbon atoms;

R is hydrogen, alkyl having from 1 to 4 carbon atoms or phenyl; M is an alkali metal atom;

m and n are 0 or an integer up to 30;

o and p are 0 or 1, and

q is 0, 1 or 2;

and wherein the amount of reactant (iii) is an amount such that the resulting polyurethane contains from 10–200 equivalents of sulphonate groups per 1,000 kilograms.

4,686,146

RADIATION-CURED RECORDING COMPOSITION WITH BI-PART LUBE

Dennis W. Karle, San Jose; Zie A. Payne, Cupertino; Fred C. Chung, Palo Alto, and Ross P. Clark, San Jose, all of Calif., assignors to Memorex Corporation, Santa Clara, Calif.

Filed Feb. 18, 1986, Ser. No. 830,402

The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.

Int. Cl.[4] G11B *5/702, 5/71*

U.S. Cl. 428—425.9 **54 Claims**

1. A high-durability/low-abrasivity coating for magnetic records using transducer heads which contact the record, at least periodically, this coating including one or more harsh pigment constituents dispersed in a resin matrix, this matrix including a binary binder system and a migratory lubricant system incorporated therein, this lubricant system comprising a liquid fluoro-silicone and a fatty acid ester combined therewith;

the fluoro-silicone constituting at least a few tenths wt.% of the dry coating solids, barely sufficient to optimize durability and abrasivity, the fluoro-silicone-ester system being sufficiently incompatible with the binder and being of sufficient concentration, sufficiently low viscosity and sufficiently moderate to low molecular weight as to enhance migration of the lubricant, this binder system being comprised of reactive material cured with beam radiation and non-reactive material such that cure thereof has produced an interaction yielding at least one "soft" segment and at least one "hard" segment in a binder system whose recording-related characteristics can be tailored, and wherein material is combined in a prescribed "semi-interpenetrating network".

4,686,147

MAGNETIC HEAD AND METHOD OF PRODUCING THE SAME

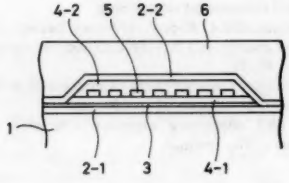
Haruhiko Matsuyama, Hiratsuka; Fusaji Shoji, Yokohama, and Shunichiro Kuwazuka, Odawara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 18, 1986, Ser. No. 829,824

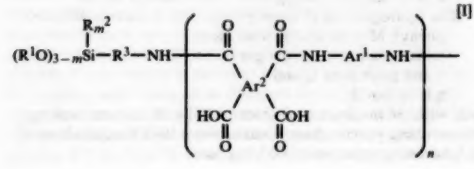
Claims priority, application Japan, Feb. 18, 1985, 60-28274; Jul. 24, 1985, 60-161807

Int. Cl.[4] G11B *5/40*

U.S. Cl. 428—447 **6 Claims**



1. A magnetic head wherein an insulation layer of said magnetic head is made of a heat-cured product of an end capped polyimide precursor with organic silicone compound that is a precursor represented by the following general formula [I] or [II] or a mixture thereof:



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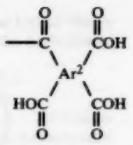
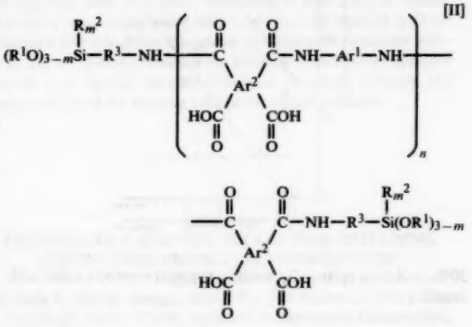
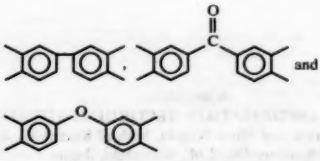


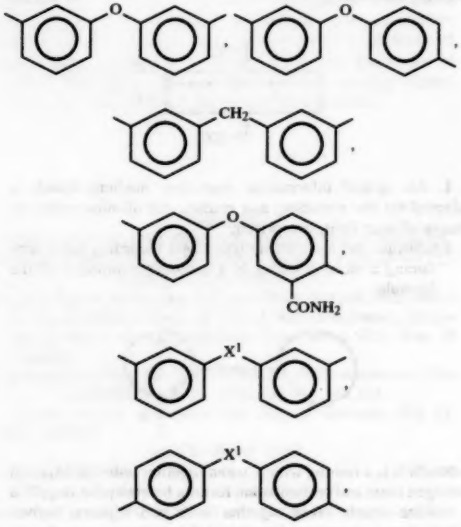
[II]



wherein R^1, R^2 and R^3 each stand for an organic radical having 1 to 6 carbon atoms; Ar^2 is at least one radical selected from the group consisting of



when Ar^1 is at one radical selected from the group consisting of



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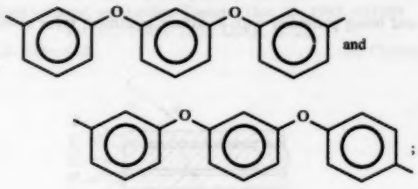
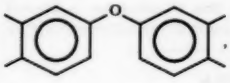


and

;

or Ar^2 is at least one radical selected from the group consisting of



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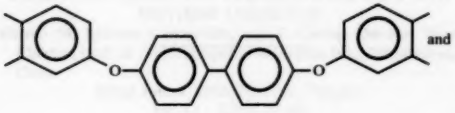
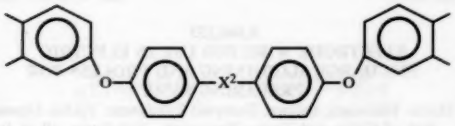
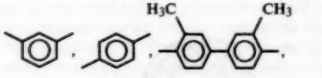


and



when Ar^1 is at least one radical selected from the group consisting of



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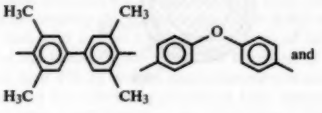
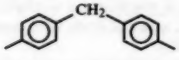
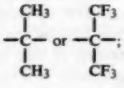


and



X_1 stands for $-SO_2-$ or $-CO-$; X_2 is



;

m is 0, 1 or 2 and n stands for a positive number of 1 to 100.

4,686,148

VINYLIDENE CHLORIDE COMPOSITION AND FILM MADE THEREFROM

Marvin R. Havens, Greer, S.C., assignor to W. R. Grace & Co., Cryovac Div., Duncan, S.C.

Filed Jul. 15, 1985, Ser. No. 755,033
Int. Cl.[4] B32B *27/08*
U.S. Cl. 428—520 **14 Claims**

1. An extrudable vinylidene chloride polymeric composition comprising:

(a) 1.0% to 8.0% by weight of a plasticizer;

(b) 0.5% to 2.0% by weight of glycerin; and,

(c) the balance comprising at least one vinylidene chloride copolymer wherein the major portion of the copolymer is vinylidene chloride.

4,686,149

MAGNETIC RECORDING MEDIUM AND METHOD OF PREPARING

Masashi Aonuma; Hideomi Watanabe; Takahito Miyoshi, and Tsutomu Okita, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 21, 1986, Ser. No. 831,784
Claims priority, application Japan, Feb. 21, 1985, 60-31602
Int. Cl.[4] B32B *27/08*
U.S. Cl. 428—522 **15 Claims**

1. A method for preparing a magnetic recording medium comprising a non-magnetic support having provided thereon a magnetic layer containing a compound which is cross-linkable or polymerizable by radiation exposure, which comprises conducting a corona discharge treatment on a surface of a support, coating an aqueous dispersion of hydrophobic polymer on the surface of the support to form an undercoat layer, providing a magnetic layer on the undercoat layer, and exposing the magnetic layer to radiation, wherein the hydrophobic polymer comprises a copolymer formed of a diolefin monomer as a first ingredient, a vinyl monomer as a second ingredient, and a monomer which is different from the first ingredient, having two or more vinyl groups, acryloyl groups, methacryloyl groups, or allyl groups per molecule as a third ingredient, and said hydrophobic polymer has a gel percentage of 95 wt% or less and wherein the third ingredient is selected from the group consisting of divinyl benzene, 1,5-hexadiene-3-yne, hexatriene, divinyl ether, divinylsulfone, diallyl phthalate, diallyl carbinol, diethylene glycol di(meth)acrylate, trimethyloyl propane tri(meth)acrylate, and trimethylolpropane di(meth)acrylate.

4,686,150

ELECTROMAGNETIC RADIATION REFLECTOR STRUCTURE AND METHOD FOR MAKING SAME

Eric Talley, Allentown, N.J., and Raj N. Gounder, Kent, Wash., assignors to RCA Corporation, Princeton, N.J.

Filed Jan. 17, 1986, Ser. No. 819,671
Int. Cl.[4] H01Q *15/14*; B32B *5/12, 15/08, 15/04*
U.S. Cl. 428—593 **9 Claims**

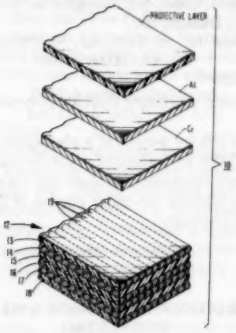
1. A reflector structure for electromagnetic radiation comprising:

a reflector substrate comprising a support structure including a face skin comprising a layer of graphite fibers reinforced epoxy (GFRE) material, said graphite fibers in said face skin tending to polarize electromagnetic waves reflected therefrom;

a deposited layer of chromium on said face skin, said layer having a thickness sufficient to provide a continuous nonporous coating over said face skin and sufficiently thin to exhibit negligible distortion relative to the face skin in the presence of thermal excursions; and

a deposited layer of aluminum on said layer of chromium,

said aluminum layer having a thickness sufficient to reflect electromagnetic radiation in a given bandwidth and sufficient to minimize the polarizing effect of the polarizing fibers.

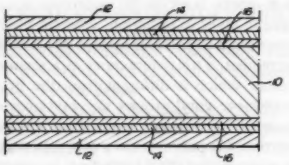


4,686,151

SUBSTRATE MATERIAL FOR MAGNETIC RECORDING MEDIA

Daniel X. Wray, Canoga Park, Calif., assignor to Dynamic Disk, Carlsbad, Calif.

Filed Apr. 9, 1985, Ser. No. 721,310
Int. Cl.[4] B21C *37/00*
U.S. Cl. 428—607 **25 Claims**



1. A magnetic data storage device comprising:
a substrate composed of a single phase metal; and
a metallic thin film magnetic data storage medium attached to said substrate by a wet plating process; wherein said substrate is a rigid disk composed of at least approximately 98% aluminum and not more than approximately 2% magnesium.

4,686,152

PACKAGING MATERIAL COMPRISING IRON FOIL, AND CONTAINER AND CONTAINER LID COMPOSED THEREOF

Hiroshi Matsubayashi, Kamakura; Kazumi Hirota, Tokyo; Hisao Iwamoto, Yokohama; Tamio Fujiwara, Tokyo; Nobuyuki Sato, and Tadahiko Katsura, both of Yokohama, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Filed Nov. 18, 1985, Ser. No. 799,388
Claims priority, application Japan, Nov. 16, 1984, 59-240507; Jun. 7, 1985, 60-122644
Int. Cl.[4] B32B *15/08*
U.S. Cl. 428—607 **21 Claims**

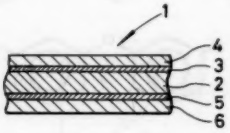
1. A packaging material, which comprises a laminate having an iron foil having a tensile strength (σ_B) in the range represented by the following formula:

$$100\ kg/mm^2 \geqq \sigma_B \geqq 30\ kg/mm^2$$

and a thickness (T) in the range represented by the following formula:

$$120\ \mu m \geqq T \geqq 15\ \mu m,$$

and being provided with a surface treatment layer containing



metallic tin, metallic chromium or metallic nickel, and an organic resin covering having a total thickness (t) in the range represented by the following formula:

$$T^{1/n}C/\sigma_B \geqq t \geqq 3\ \mu m$$

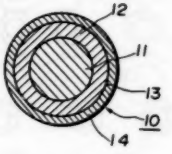
wherein n is 5.6 and C is 4630.

4,686,153

ELECTRODE WIRE FOR USE IN ELECTRIC DISCHARGE MACHINING AND PROCESS FOR PREPARING SAME

Haruo Tominaga, Sakura; Teruyuki Takayama; Yoshio Ogura, both of Chiba, and Tetsuo Yamaguchi, Yokohama, all of Japan, assignors to Fujikura Ltd., Tokyo, Japan

Filed Dec. 4, 1985, Ser. No. 804,816
Claims priority, application Japan, Dec. 8, 1984, 59-259459; May 27, 1985, 60-113685
Int. Cl.[4] B23K *35/22*
U.S. Cl. 428—610 **6 Claims**



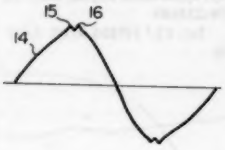
1. In an electrode wire for use in machining a workpiece by means of electric spark discharge, said electrode wire comprising:
a core wire including steel wire having a copper cladding, said copper cladding having a cross-sectional area approximately 10 to 70 percent of the cross-sectional area of said core wire;
a copper-zinc alloy layer over said core wire, said alloy layer having a thickness of from 0.1 to 15 microns, and an average zinc concentration being less than 50% by weight of the alloy layer weight, but not less than 10% by weight of the alloy layer weight, the concentration of zinc in said copper-zinc alloy layer increasing gradually in a radially outward direction to result in an alloy layer portion having a zinc concentration from 40% to 50% by weight.

4,686,154

SECURITY SYSTEM LABEL

Ezequiel Mejia, Longueuile, Canada, assignor to Sigma Security Inc., Toronto, Canada

Filed Mar. 1, 1984, Ser. No. 585,074
Claims priority, application Canada, Oct. 20, 1983, 439389
Int. Cl.[4] H01F *1/00*; G08B *13/26*
U.S. Cl. 428—611 **10 Claims**



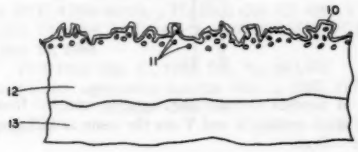
1. A security label for producing pulses detectable from an applied magnetic field comprised of at least two distinct closely spaced and similarly magnetically oriented elements formed of magnetically soft materials, the elements having different coercivities but equal magnetic saturation thresholds.

4,686,155

OXIDATION RESISTANT FERROUS BASE FOIL AND METHOD THEREFOR

Farrell M. Kilbane, Centerville, and F. Curtiss Dunbar, West Chester, both of Ohio, assignors to Armco Inc., Middletown, Ohio

Filed Jun. 4, 1985, Ser. No. 741,282
Int. Cl.[4] B32B *27/05*
U.S. Cl. 428—653 **9 Claims**



1. Aluminum coated ferrous base metal foil having a thickness not greater than 0.13 mm formed by cold reduction of a hot dip aluminum coated ferritic base metal strip containing from 10% to about 35% by weight chromium, up to 3% aluminum, up to 1% silicon, and balance essentially iron, said ferritic base metal strip having a thickness of at least 0.25 mm and an aluminum coating thickness ranging from 0.013 to 0.13 mm on each side, said coated foil having a ratio of total aluminum coating thickness to base metal foil thickness of at least 1:10, with at least 4% by weight total aluminum in said coated foil, said coated foil exhibiting improved high temperature oxidation resistance and improved wet corrosion resistance.

4,686,156

COATED CEMENTED CARBIDE CUTTING TOOL

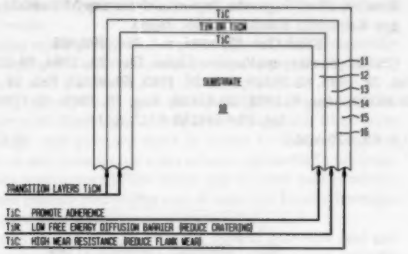
J. Gary Baldoni, II, Walpole, and Charles D'Angelo, Southboro, both of Mass., assignors to GTE Service Corporation, Waltham, Mass.

Filed Oct. 11, 1985, Ser. No. 786,734
Int. Cl.[4] B22E *3/00*; C23C *11/00*
U.S. Cl. 428—698 **15 Claims**

1. A coated article for cutting tool and flank wear resistant applications which comprises a hard metal substrate and an abrasion resistant and cratering resistant multilayer coating on at least a portion of said substrate, said coating consisting of:

(a) a first layer, contiguous with said substrate, and selected from the carbides of metals selected from Titanium, Zirconium, Hafnium, Vanadium, Niobium and Tantalum;

(b) a second layer, superposed over said first layer, selected from the nitrides or carbonitrides of metals selected from



metals selected from Titanium, Zirconium, Hafnium, Vanadium, Niobium and Tantalum; and

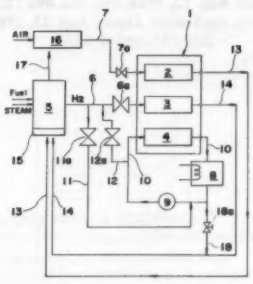
(c) a third layer, superposed over said second layer, selected from the carbides of metals selected from Titanium, Zirconium, Hafnium, Vanadium, Niobium and Tantalum.

4,686,157

FUEL CELL POWER SYSTEM

Yasuo Miyake, Neyagawa; Osamu Tajima, Hirakata; Masato Nishioka, Ibaraki, and Yasuhiko Itoh, Yawata, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Jan. 6, 1986, Ser. No. 816,595
Claims priority, application Japan, Jan. 18, 1985, 60-7811
Int. Cl.[4] H01M *8/06*
U.S. Cl. 429—19 **4 Claims**



1. A fuel cell power system comprising a fuel conditioning means for converting hydrocarbon fuels to hydrogen-rich gas, a process air feeding means, and a fuel cell stack means including an anode gas chamber connected to an inlet thereof to the fuel conditioning means, a cathode gas chamber connected to the process air feeding means, and a cooling gas chamber having a cooling medium circulating line including a heat exchanger and a blower, a fuel gas feed line connecting the conditioning means to the inlet of the anode chamber, a first conduit means connecting the cooling medium circulating line to the fuel gas feed line, the first conduit means including a first valve means, and a second conduit means connecting the fuel gas feed line to the cooling medium circulating line, the second conduit means including a second valve means.

4,686,158

SOLID ELECTROLYTE FUEL CELL AND METHOD FOR PREPARING IT

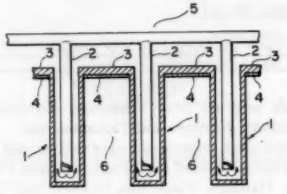
Toshiro Nishi; Nobuaki Murakami; Kenji Ueda; Seiichi Shirakawa; Akira Notomi; Kenichi Hisamatsu, and Shozo Kaneko, all of Nagasaki, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 23, 1985, Ser. No. 790,488

Claims priority, application Japan, Oct. 23, 1984, 59-222792; Feb. 28, 1985, 60-39329; Feb. 28, 1985, 60-39327; Feb. 28, 1985, 60-39330; Mar. 5, 1985, 60-43444; Aug. 15, 1985, 60-179691

Int. Cl.⁴ H01M *8/12, 8/24*

U.S. Cl. 429—26 **10 Claims**



1. A solid electrolyte fuel cell which comprises a plurality of unit cells each having a structure in which there are laminated a gas-permeable oxygen electrode made from an electron-conducting material, a solid electrolyte consisting of a $(CeO_2)_{1-x}(x=0.05 \text{ to } 0.8)$ binary system or a third component-containing $(CeO_2)_{1-x}(CaO)_x(x=0.05 \text{ to } 0.8)$ system and a gas-permeable fuel electrode made from an electron-conducting material on a gas-permeable support, said unit cells being connected to each other in series.

4,686,159

LAMINATED LAYER TYPE FUEL CELL

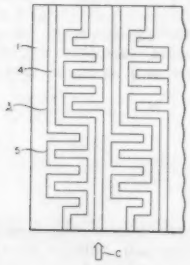
Hideaki Miyoshi, Kobe, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 12, 1986, Ser. No. 895,722

Claims priority, application Japan, Aug. 13, 1985, 60-179632

Int. Cl.⁴ H01M *8/24*

U.S. Cl. 429—39 **3 Claims**



1. A laminated layer type fuel cell for converting electrochemical reaction of fuel and oxidizer into electric power, said fuel cell comprising a plurality of gas separation plates, each having rectilinear and zigzag portions of fuel and oxidizer channels and a plurality of electrode cells sandwiched between said gas separation plates and sequentially laminated, each formed of a fuel electrode, an electrolyte matrix, and an oxidizer electrode whereby partial pressures of reaction gases produced by the electrochemical reaction are equalized throughout the cell to equalize cell reactions and temperature distribution in the cell.

4,686,160

POLYACETYLENE COMPOSITE PROCESS FOR PRODUCTION THEREOF, AND METHOD FOR USE THEREOF

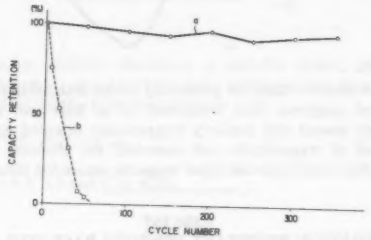
Akira Yoshino, Fujisawa, and Kenichi Sanechika, Kawasaki, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 679,399, Dec. 7, 1984, Pat. No. 4,634,633. This application Aug. 15, 1986, Ser. No. 896,633

Claims priority, application Japan, Dec. 13, 1983, 58-233648; Dec. 13, 1983, 58-233649

Int. Cl.⁴ H01M *4/60, 6/16*

U.S. Cl. 429—50 **10 Claims**



1. A method for the use of a polyacetylene composite, characterized by using as a negative electrode active substance for a secondary battery an n-doped polyacetylene composite coated with at least one ionic organic compound represented by the general formula (I):

(I)

wherein M denotes at least one member selected from the group of alkali metals; X and Y are the same or different and represent —O or

R_1, R_2, R_3, and R_4 each are at least one member selected from the group consisting of hydrogen, substituted or unsubstituted alkyl groups of 1 to 5 carbon atoms, and substituted or unsubstituted alkoxy groups of 1 to 5 carbon atoms, or R_1 and R_2 or R_3 and R_4 in combination form a cyclic structure.

4,686,161

METHOD OF INHIBITING VOLTAGE SUPPRESSION LITHIUM/FLUORINATED CARBON BATTERIES

George A. Shia, North Tonawanda, and David J. Friedland, Snyder, both of N.Y., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 16, 1985, Ser. No. 776,546

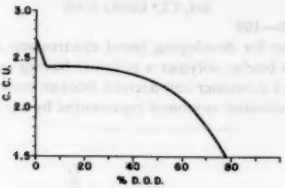
Int. Cl.⁴ H01M *10/44, 4/58*

U.S. Cl. 429—50 **8 Claims**

1. An improved lithium/fluorinated carbon battery wherein the cathode comprises a blend of at least two different CF_x compositions which are derived from petroleum-based coke products which have been prepared by heat treatment at a temperature between about 800° C. and 2,000° C.: (a) a bulk CF_x and (b) an additive CF_x and wherein from about 0.5 percent to about 50 percent of (b) is characterized as having a closed circuit voltage of at least 150 mV above the plateau

voltage of the bulk CF_x and a specific capacity above 600 mAH/g.

6. A method for the elimination of suppression of the closed circuit voltage of a Li/CF_x battery during the initial part of its discharge comprising blending with bulk coke-based CF_x from about 0.5 percent to about 50 percent of a different additive coke-based CF_x which does not show any voltage suppression and has a closed circuit voltage of at least 150 mV above the



plateau voltage of the bulk CF_x and a specific capacity about 600 mAH/g with the bulk CF_x in forming the Li/CF_x battery cathode, both said bulk coke-based CF_x and additive coke-based CF_x being derived from petroleum-based coke products which have been prepared by heat treatment at a temperature between about 800° C. and 2,000° C., to provide a cathode mixture which has minimal voltage suppression and good capacity.

4,686,162
OPTICALLY STRUCTURED FILTER AND PROCESS FOR ITS PRODUCTION

Günther Stangl, and Friedrich Rüdenauer, both of Vienna, Austria, assignors to Osterreichisches Forschungszentrum Seibersdorf GES, mbH, Lenaugasse, Austria

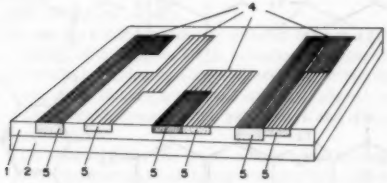
PCT No. PCT/AT84/00010, § 371 Date Oct. 12, 1984, § 102(e) Date Oct. 12, 1984, PCT Pub. No. WO84/03571, PCT Pub. Date Sep. 13, 1984

PCT Filed Feb. 27, 1984, Ser. No. 667,493

Claims priority, application Austria, Mar. 1, 1983, 717/83

Int. Cl.[4] G03F *9/00*

U.S. Cl. 430—5 **6 Claims**



1. A method of manufacturing an optically structured filter for filtering electromagnetic radiation of at least one predetermined wavelength range, said method comprising the steps of:

preparing a substantially homogeneous unstructured filter layer possessing a substantially smooth surface;

forming the optically structured filter possessing the substantially unstructured smooth surface using a substantially one-step operation by exposing said substantially homogeneous unstructured filter layer at said substantially smooth surface in an unprotected condition and in preselected areas thereof to at least one ion beam and thereby implanting ions in said preselected areas of said substantially homogeneous unstructured filter layer and forming a predetermined pattern containing at least one locally homogeneous region which differs with respect to its transmission for said at least one predetermined wavelength range of electromagnetic radiation from a remaining, non-exposed portion of said substantially homogeneous unstructured filter layer;

selecting as said at least one ion beam a practically non-focused ion beam;

preparing a primary mask comprising predetermined sections which are permeable for said practically non-focused ion beam;

arranging said primary mask rearwardly of said substantially homogeneous unstructured filter layer as seen in the direction of said ion beam;

said step of exposing said substantially homogeneous unstructured filter layer entails irradiating such filter layer through said primary mask in order to thereby implant ions in said preselected areas of said substantially homogeneous unstructured filter layer and to form said predetermined pattern containing said at least one locally homogeneous region of different transmission;

arranging an ion optical imaging system between said primary mask and said substantially homogeneous unstructured filter layer; and

during said step of exposing said homogeneous unstructured filter layer, imaging said primary mask by means of said ion optical imaging system upon said substantially homogenous unstructured filter layer.

4,686,163
ELECTROPHOTOGRAPHIC COLOR IMAGING METHOD

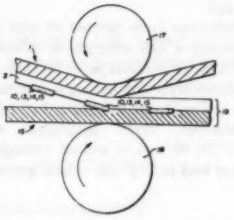
Yee Seung Ng, Fairport; Lawrence E. Contois; John D. Mitchell, both of Webster, and James D. Walling, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 773,528, Sep. 6, 1985, Pat. No. 4,600,669, which is a continuation of Ser. No. 686,509, Dec. 26, 1984, abandoned. This application May 2, 1986, Ser. No. 859,273

The portion of the term of this patent subsequent to Jul. 15, 2003, has been disclaimed.

Int. Cl.[4] G03G *13/01*

U.S. Cl. 430—47 **10 Claims**



1. A color imaging method comprising:

(I) forming a first color image on the dielectric support of an electrophotographic element, comprising:

(a) a photoconductive layer on an electrically conductive substrate capable of transmitting actinic radiation to which the photoconductive layer is responsive and

(b) a releasable transparent dielectric support comprising the photoconductive layer or an overcoat thereof, forming a surface of the element capable of holding an applied electrostatic charge, by

(i) overall charging the surface of the dielectric support,

(ii) imagewise-exposing the photoconductive layer to actinic radiation to form a first electrostatic image on the surface of the dielectric support, and

(iii) developing the first electrostatic image with a first color developer composition to form the first color image,

(II) forming a second color image over the first color image on the surface of the dielectric support by

(iv) overall charging the surface of the dielectric support and first color image,

(v) while the dielectric support and first color image are still charged, imagewise-exposing the photoconductive layer to actinic radiation through the substrate to form a second electrostatic image, and

(vi) developing the second electrostatic image with a second color developer composition to form the second color image,

(III) contacting the surface of the dielectric support having the color images thereon with a transparent receiving element, and

(IV) transferring the dielectric support and color images to the receiving element to form a multicolor image transparency.

4,686,164

ELECTROPHOTOSENSITIVE MEMBER WITH MULTIPLE LAYERS OF AMORPHOUS SILICON

Izumi Osawa, Ikeda; Isao Doi, Toyonaka, and Toshiya Natsuhara, Amagasaki, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 10, 1985, Ser. No. 753,586

Claims priority, application Japan, Jul. 20, 1984, 59-151768

Int. Cl.[4] G03G *5/082*

U.S. Cl. 430—63 **4 Claims**

1. An electrophotosensitive member which comprises:

a conductive substrate;

an intermediate layer of amorphous silicon formed on said conductive substrate and including oxygen or carbon and an element in Group III A or VA of the Periodic Table in an amount to control the conductivity thereof to a polarity opposite to the polarity of charges induced in said substrate upon charging wherein said intermediate layer has a thickness of 30 Å to 2 μm and including 0.01 to 40 atomic % of said oxygen or 5 to 60 atomic % of said carbon; and

a photoconductive layer formed on said intermediate layer and including a first amorphous silicon layer, an amorphous silicon:germanium layer formed on said first amorphous silicon layer and having a composition represented by a-Si_{1-x}:Ge_xH, the thickness d of said amorphous silicon:germanium layer satisfying a condition of $0.07 \leqq dx^2 \leqq 0.90$, and a second amorphous silicon layer formed on said amorphous silicon:germanium layer.

4,686,165

SUBSTRATE FOR AMORPHOUS SILICON PHOTORECEPTOR

Fumiyuki Suda; Masaru Yasui, both of Yokohama, and Kazuhiro Miyamoto, Tokyo, all of Japan, assignors to Stanley Electric Co., Ltd., Tokyo, Japan

Filed Jul. 15, 1985, Ser. No. 755,270

Claims priority, application Japan, Jul. 17, 1984, 59-147004

Int. Cl.[4] G03G *5/082, 5/10*

U.S. Cl. 430—69 **4 Claims**

1. An amorphous silicon photoreceptor element, comprising:

an electroconductive metal substrate made of aluminum or an aluminum alloy; and

an amorphous silicon photoreceptive layer deposited on said substrate by using a plasma CVD apparatus, wherein:

said substrate has, formed on its surface, crystal grains each having diameter not exceeding about 100 microns.

4,686,166

ELECTROPHOTO TONER COMPRISING IMIDO GROUP MONOMER UNIT IN POLYMER

Yuugo Kumagai; Isamu Moribe; Takayuki Saito; Toshiyuki Fujita, all of Hitachi, and Akihiro Kobayashi, Ichihara, all of Japan, assignors to Hitachi Chemical Co., Tokyo, Japan

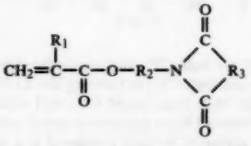
Filed Oct. 6, 1986, Ser. No. 915,492

Claims priority, application Japan, Oct. 7, 1985, 60-223326; Oct. 7, 1985, 60-223327; Jun. 13, 1986, 61-138723; Jul. 1, 1986, 61-154648

Int. Cl.[4] G03G *9/08*

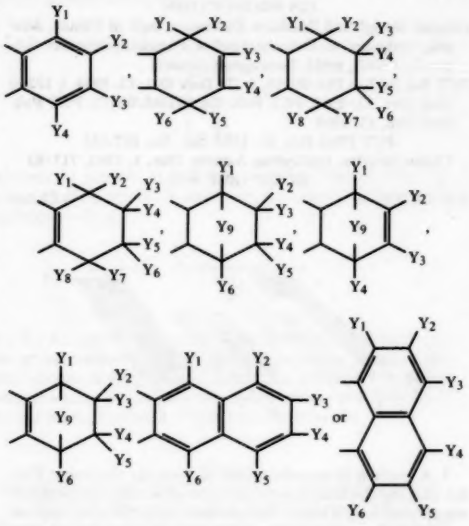
U.S. Cl. 430—109 **6 Claims**

1. A toner for developing latent electrostatic images comprising as a binder polymer a polymer having as an essential component a monomer unit derived from an imido group-containing unsaturated monomer represented by the formula:

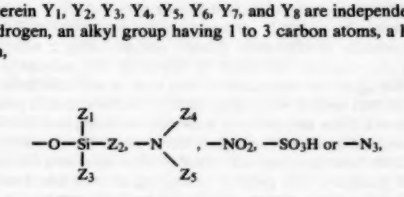


(I)

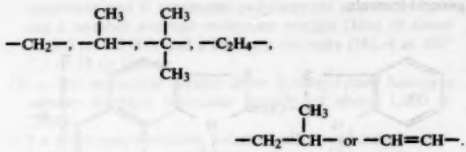
wherein R_1 is hydrogen or a methyl group; R_2 is an alkylene group having 1 to 6 carbon atoms or a divalent organic group having an alicyclic or aromatic ring; and R_3 is a group represented by the formula:

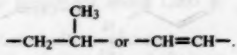


wherein Y_1, Y_2, Y_3, Y_4, Y_5, Y_6, Y_7, and Y_8 are independently hydrogen, an alkyl group having 1 to 3 carbon atoms, a halogen,



in which Z_1, Z_2, Z_3, Z_4 and Z_5 are independently hydrogen or an alkyl group having 1 to 5 carbon atoms; and Y_9 is





4,686,167

COMPOSITIONS COMPRISING ETHANE DIOIC ACID HYDRAZIDE COMPOUNDS AND DERIVATIVES USEFUL AS DOT-PROMOTING AGENTS

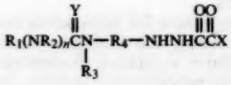
Bruce M. Resnick, Binghamton, and Allan J. Wexler, Endicott, both of N.Y., assignors to Anitec Image Corporation, Binghamton, N.Y.

Filed Sep. 26, 1985, Ser. No. 780,578

Int. Cl.[4] G03C *1/06, 5/24*

U.S. Cl. 430—264 **23 Claims**

1. A silver halide photographic emulsion comprising radiation-sensitive silver halide grains capable of forming a surface-latent image, a binder and a dot quality-promoting amount of a compound of the formula:



wherein:

X=NR_5R_6, or —OR_7;

R_1 and R_2 are independently selected from the group consisting of hydrogen, alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, alkylaminoalkyl and arylalkyl substituents having up to 18 carbon atoms; cycloalkyl, phenyl, naphthyl, alkylphenyl, cyanophenyl, halophenyl, and alkoxyphenyl substituents;

R_3 is selected from the group consisting of hydrogen, benzyl, alkoxybenzyl, halobenzyl and alkylbenzyl substituents provided that R_3 is hydrogen when neither R_1 nor R_2 are hydrogen; wherein R_1 and R_2 or R_1 and R_3 can be linked together to form a heterocyclic ring system having 3–10 carbon atoms;

R_4 is a divalent aromatic group with the two valences being ortho- or para- to each other said group being substituted or unsubstituted;

R_5, R_6 and R_7 are independently selected from the group consisting of hydrogen, alkyl, hydroxyalkyl, haloalkyl, alkoxyalkyl, alkylaminoalkyl, acylaminoalkyl, aminoalkyl and phenylalkyl substituents having up to 12 carbon atoms; cycloalkyl, phenyl, naphthyl, alkylphenyl, cyanophenyl, halophenyl and alkoxyphenyl substituents; and wherein R_5 and R_6 can be linked to form a heterocyclic ring system containing 3–10 atoms;

Y is selected from the group consisting of sulfur and oxygen atoms;

n is zero or one; provided that n=1 when Y is sulfur.

4,686,168

FLUOROALKYL ACRYLATE RESIST MATERIAL AND PROCESS FOR FORMING FINE RESIST PATTERN

Tsuneo Fujii, Suita; Hiroshi Inukai, Takatsuki; Takayuki Deguchi, Ibaraki; Toshihiko Amano, Settsu; Masami Kakuchi, Katsuta; Hiroshi Asakawa, and Osamu Kogure, both of Mito, all of Japan, assignors to Daikin Kogyo Co., Ltd., Osaka and Nippon Telegraph & Telephone Public Corporation, Tokyo, both of, Japan

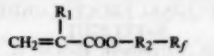
Division of Ser. No. 450,726, Dec. 17, 1982, Pat. No. 4,539,250. This application Mar. 11, 1985, Ser. No. 710,190

Claims priority, application Japan, Dec. 19, 1981, 56-205877; Dec. 19, 1981, 56-205876; Dec. 26, 1981, 56-212730; Dec. 26, 1981, 56-212729

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—326 **9 Claims**

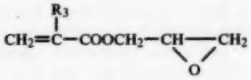
1. A process for forming fine resist patterns which comprises irradiating portions of a positive resist film with high energy rays, the positive resist film being made of a copolymer of a fluoroalkyl acrylate having the general formula (I):



(I)

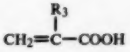
wherein R_1 is methyl group, ethyl group, a halogen-substituted methyl or ethyl group, a halogen atom or hydrogen atom, R_2 is a bivalent hydrocarbon group having 1 to 6 carbon atoms, and R_f is a fluoroalkyl group having 1 to 15 carbon atoms,

and an acrylic comonomer selected from the group consisting of a glycidyl acrylate having the general formula (II):



(II)

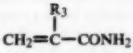
wherein R_3 is hydrogen atom, methyl group or ethyl group, an acrylic acid having the general formula (III):



(III)

wherein R_3 is as defined above,

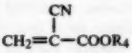
an acrylamide having the general formula (IV):



(IV)

wherein R_3 is as defined above,

and an α-cyanoacrylate having the general formula (V):



(V)

wherein R_4 is hydrogen atom or an alkyl group having 1 to 5 carbon atoms, the ratio of the fluoroalkyl acrylate (I) to the acrylic comonomer being from 80:20 to 99.9:0.1 by mole and conducting development with a developer to remove only the irradiated portions of the positive resist film.

4,686,169

OPTICAL RECORDING MEDIUM AND PRODUCTION OF THE SAME

Kimiaki Yoshino, Yawata; Eiji Ando, Katano; Jinsei Miyazaki, Hirakata, and Kazuhisa Morimoto, Settsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 8, 1985, Ser. No. 796,445

Claims priority, application Japan, Nov. 13, 1984, 59-239743; Nov. 13, 1984, 59-239744; Nov. 28, 1984, 59-250834; Jun. 12, 1985, 60-127414

Int. Cl.[4] G03C *1/733*

U.S. Cl. 430—339 13 Claims

1. An optical recording medium comprising a substrate and an information recording layer which consists of monomolecular layer assemblies comprising a photochromic dye which exhibits photochromism based on cis-trans isomerization and is stable in both cis and trans forms, which monomolecular layer assemblies are oriented in a two-dimensional plane.

4,686,170

PHOTOGRAPHIC SILVER COMPLEX DIFFUSION TRANSFER REVERSAL PROCESS UNDER YELLOW SAFELIGHT

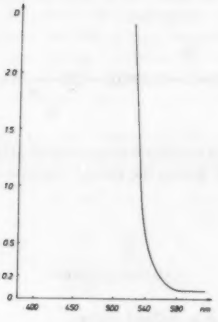
Leon L. Vermeulen, Herenthout; Theofiel H. Ghys, Kontich; Willy P. De Smedt, Mechlin; Ludovicus H. Vervloet, Kessel, and Paul R. Callant, Edegem, all of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Apr. 4, 1986, Ser. No. 848,267

Claims priority, application 04091985, Apr. 9, 1985, 85200546.1

Int. Cl.[4] G03C *5/54, 1/16*

U.S. Cl. 430—244 10 Claims



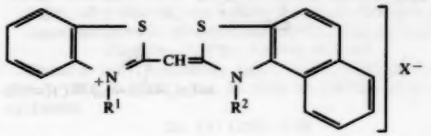
1. A photographic silver complex diffusion transfer reversal process which comprises the steps of:

(1) exposing a photographic material comprising a support and a silver halide emulsion layer containing silver halide grains dispersed in a hydrophilic colloid binder, the silver halide grains including at least 70 mole % of silver chloride and being spectrally sensitized,

(2) developing the image-wise exposed silver halide emulsion layer in the presence of a developing agent and a silver halide solvent being a silver halide complexing agent,

(3) transferring by diffusion dissolved complexed silver halide from said emulsion layer into an image-receiving layer that forms an integral part of the photographic material while being present on a same support in water-permeable relationship with the silver halide emulsion layer or that forms part of a separate image receiving material, the image-receiving layer containing development nuclei acting as physical development catalyst for the dissolved complexed silver halide, and

is characterised in that the silver halide grains are spectrally sensitized with at least one dye corresponding to the following general formula:



wherein:

each of R^1 and R^2 (the same or different) represents an alkyl group, and

X^- represents an anion or is missing when R^1 or R^2 already contains an anionic structural part, and

wherein, said dye or a mixture of said dyes provides to the silver halide emulsion layer a spectral sensitivity mainly in the range of 400 to 500 nm and does not extend its spectral sensitivity substantially beyond 500 nm so that the sensitivity of said layer at 530 nm is at least 2^7 lower than that at 500 nm, and wherein the handling of the photographic material during said steps (1) to (3) is effected under yellow safelight conditions corresponding to the light transmitted by a cut-off filter having at 500 nm a density of at least 2.5, at 530 nm a density not larger than 2.0, at 540 nm a density not larger than 1.0, at 550 nm a density not larger than 0.4, at 560 nm a density not larger than 0.2 and beyond 580 nm a density not larger than 0.1.

4,686,171

PHOTOPOLYMERIZABLE FILMS CONTAINING PLASTICIZER SILICA COMBINATIONS

Charles C. Fifield, Wilmington; Richard T. Mayes, Greenville; Marilyn Tate, Newark, and Daniel F. Varnell, Wilmington, all of Del., assignors to Hercules Incorporated, Wilmington, Del.

Filed Feb. 14, 1986, Ser. No. 830,024

Int. Cl.[4] G03C *1/76*

U.S. Cl. 430—273 12 Claims

1. In a photopolymerizable composition comprising a carboxyl group-containing, film-forming polymeric binder, a free radical photoinitiator, an addition photopolymerizable monomer, and a thermal polymerization inhibitor, the improvement wherein the composition further comprises:

a. at least one plasticizer in an amount of about 5% to about 20% by weight, wherein the plasticizer is tri-n-butyl citrate, N-ethyltoluene sulfonamide, glycerol triacetate, or reaction product of (i) an isocyanate terminated block copolymer of polyesterdiol blocks selected from the group comprising polyalkylene adipatediol and polyalkylene succinatediol with polyetherdiol blocks comprising polyalkylene glycol/ethylene oxide and (ii) at least one hydroxy substituted acrylate or methacrylate; and

b. a siliceous material having a particle size of less than about 10 microns, in an amount of about 13% to 25% by weight, wherein the material is precipitated silica, a combination of fumed silica and aluminum oxide, or a mixture thereof.

4,686,172

PHOTOSENSITIVE ELASTOMERIC COMPOSITION FOR FLEXOGRAPHIC PRINTING PLATES HAVING IMPROVED SOFTNESS

John R. Worns, Mishawaka, Ind.; Milton Farber, Bethany, Conn., and David T. Hughes, Shropshire, England, assignors to Uniroyal Plastics Co., Inc., Mishawaka, Ind. and Royalite Plastics Limited, Newbridge, Scotland

Filed Jul. 18, 1985, Ser. No. 756,861

Int. Cl.[4] G03C *1/71*

U.S. Cl. 430—286 7 Claims

1. A photosensitive elastomeric composition which comprises:

(A) a thermoplastic elastomeric block copolymer having the

structure AB or ABA whereby A represents polystyrene sequences and B represents polyisoprene sequences having a number average molecular weight (Mn) of about 30,000 to 125,000, and a Mooney viscosity (ML-4 at 100° C.) of 35 or higher;

(B) a low molecular weight diene homopolymer having a number average molecular weight of about 1,000 to 25,000;

(C) a photopolymerizable, ethylenically unsaturated cross-linking agent compatible with polymers (A) and (B) in an amount of between 2 and 40 parts based on 100 parts (A) and (B); and

(D) an addition polymerization initiator activatible by actinic radiation in an amount of between 0.01 and 10 parts based on 100 parts of (A) and (B);

wherein the weight ratio of polymer (A) to polymer (B) is from about 95: to 50:50.

4,686,173

ETCHING METHOD EMPLOYING POSITIVE PHOTORESIST FILM

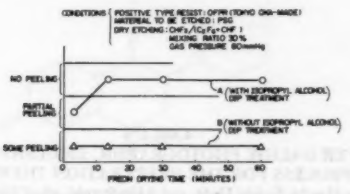
Jun Kanamori, and Mamoru Yokoyama, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 23, 1985, Ser. No. 758,073

Claims priority, application Japan, Jul. 23, 1984, 59-151415

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—313 **6 Claims**



1. An etching method suitable for a semiconductor device manufacturing process comprising the steps of:

(a) dipping a material layer to be etched formed over a semiconductor substrate in an organic solvent;

(b) placing the structure obtained by the step (a) in a fluorohydrocarbon vapor to dry the surface of said material layer to be etched;

(c) forming a layer of positive photoresist over the surface of said material layer;

(d) forming in a selected surface of said positive photoresist layer an opening exposing a surface of said material layer; and

(e) etching said material layer exposed in said opening to form an opening therein, said fluorohydrocarbon vapor of step (b) being used to increase the adhesiveness of the material layer to the photoresist layer by preventing peeling of the photoresist layer from said material layer.

4,686,174

METHOD AND MATERIAL FOR THE PRODUCTION OF CONTINUOUS TONE SILVER IMAGES BY THE SILVER COMPLEX DIFFUSION TRANSFER REVERSAL PROCESS

René M. De Keyzer, Bornem; Jos A. Vaes, Betekom, and Jules R. Berendsen, Deurne, all of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed Jan. 7, 1986, Ser. No. 816,839

Claims priority, application European Pat. Off., Jan. 15, 1985, 85100348

Int. Cl.[4] G03C *5/54, 1/48, 1/76*

U.S. Cl. 430—502 **12 Claims**

1. In a method for the production of continuous tone silver images by diffusion transfer reversal processing, wherein a photographic material is image-wise exposed to continuous tone information and subjected to a diffusion-transfer-reversal processing under alkaline aqueous conditions in the presence of at least one developing agent and a silver ion complexing agent to transfer complexed silver ions to a separate receiving layer and containing development nuclei catalyzing the reduction of transferred complexed silver ions, the improvement comprising:

(1) said photographic material contains two independently prepared hydrophilic colloid-silver halide emulsions of different halide composition and different photo-sensitivity in operative contact on the same side of the same support;

(2) the first of said silver halide emulsions is a silver halide emulsion containing at least 70 mole % of silver chloride and from 0 to 5 mole % of silver iodice, with the remainder being silver bromide, and the second silver halide emulsion is a silver bromide emulsion free from AgCl or is a silver bromochloride emulsion having a silver chloride content not exceeding that of said first emulsion by more than 2 mole %, said second emulsion containing from 0 to 10 mole % of AgI;

(3) the second silver halide emulsion has a sufficiently higher sensitivity to 400–700 nm light than the first silver halide emulsion that under the same wedge exposure conditions and development conditions as specified hereinafter, the log exposure values (log E) of a first emulsion layer alone on a transparent support and of a second emulsion layer only on such support at the same silver halide coverage of 3.5×10^{-2} moles of silver halide per m^2 and a ratio by weight of gelatin binder to silver halide expressed as equivalent grams of silver nitrate of 0.5, with said log exposures being measured at density 0.3, differ from each other by a value of at least 0.30 and at most 1.50, and

(4) the molar proportion in said photographic material of silver halide grains of said first emulsion to silver halide grains of said second emulsion is such that the maximum gradient, or gamma (γ), of the sensitometric curve of a wedge image obtained by said diffusion-transfer-reversal process with said photographic material in an image-receiving layer carried on an opaque support having a diffuse reflection density of 0.08 is not higher than 1.50, or

(5) the molar proportion in said photographic material of silver halide grains of said first emulsion to silver halide grains of said second emulsion is such that the maximum gradient, or gamma (γ), of the sensitometric curve of a wedge image obtained by said diffusion-transfer-reversal process with said photographic material in an image-receiving layer carried on a transparent support having a diffuse transmission density of 0.08 is not higher than 3.00; and

said development conditions called for in (3) above being the following:

developer composition	
demineralized water	800 ml
p-methylamino-phenol	1.5 g
sodium sulphite	50 g
hydroquinone	6 g
sodium carbonate	32 g
potassium bromide	2 g
ethylene diamine tetra-acetic acid sodium salt	1.5 g
demineralized water up to	1000 ml
development temperature	20° C.
development duration	3 min.

4,686,175

SILVER HALIDE MULTI-LAYERED COLOR PHOTOGRAPHIC LIGHT SENSITIVE MATERIAL

Tadashi Ogawa, and Masaki Okazaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 571,764, Jan. 18, 1984, abandoned. This application Oct. 18, 1985, Ser. No. 788,516

Claims priority, application Japan, Jan. 19, 1983, 58-7154

Int. Cl.[4] G03C *1/40, 1/46, 1/08, 7/26*

U.S. Cl. 430—505 **29 Claims**

1. A silver halide multilayered color photographic light-sensitive material, comprising:

a support base having thereon:

a green-sensitive emulsion layer for forming a magenta color, the green-sensitive layer having a maximum sensitivity in the range of 535 nm to 555 nm;

a blue-sensitive emulsion layer for forming a yellow color, the blue-sensitive layer having a maximum sensitivity in the range of 80 to 110 nm shorter than the maximum sensitivity of the green-sensitive layer; and

a red-sensitive emulsion layer for forming a cyan color, the red-sensitive layer having a maximum sensitivity in the range of 75 to 95 nm longer than that of the green-sensitive layer; and

a compound capable of releasing a diffusible development inhibitor or its precursor, wherein the development inhibitor or its precursor has a diffusibility of 0.4 or more, by a coupling reaction with the oxidation product of a color developing agent.

4,686,176

MULTILAYER MULTI-COLOR PHOTOGRAPHIC MATERIAL

Toshihiko Yagi; Katsumasa Yamazaki; Kenji Michiue; Yoshiharu Mochizuki, and Sohei Goto, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Sep. 20, 1985, Ser. No. 778,320

Claims priority, application Japan, Sep. 25, 1984, 59-200980

Int. Cl.[4] G03C *1/46, 1/02*

U.S. Cl. 430—506 **21 Claims**

1. In a light-sensitive silver halide photographic material having blue-sensitive, green-sensitive and red-sensitive photosensitive layers on a support and being capable of forming a multi-color image, the improvement wherein at least one of said photosensitive layers comprises a high sensitivity layer and a low sensitivity layer; at least one of said high sensitivity layers contains flat plate silver halide grains with an average aspect ratio of 5:1 or higher; and at least one of said low sensitivity layers contains an emulsion comprising silver halide grains which are substantially mono-dispersed, said mono-dispersed grains have a grain size within the range of ±20% of the average grain size in an amount of 60% by weight or more based on the total amount of silver halide grains.

4,686,177

SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIALS

Kozo Aoki; Michio Ono; Naoki Saito, and Makoto Umemoto, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

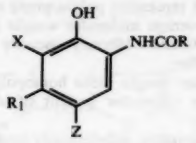
Filed Jul. 31, 1985, Ser. No. 760,852

Claims priority, application Japan, Jul. 31, 1984, 59-161239

Int. Cl.[4] G03C *1/40, 7/34*

U.S. Cl. 430—553 **2 Claims**

1. A silver halide color photographic light-sensitive material containing a cyan coupler of the general formula (I):



(I)

wherein R represents an unsubstituted linear or branched aliphatic group or a linear or branched aliphatic group substituted with one or more substituents selected from the group consisting of a chlorine atom, an alkoxy group, an alkylthio group, an arylthio group, an alkylsulfonyl group, an arylsulfonyl group, a sulfonamido group, an acylamino group, an alkyloxycarbonyl group, an aryloxycarbonyl group, a carbamoyl group, an alkylcarbonyloxy group, an arylcarbonyloxy group, a carboxyl group and a hydroxyl group; R_1 represents a linear or branched alkyl group having 2 to 4 carbon atoms; X is a fluorine atom or a chlorine atom; and Z is a fluorine atom or a chlorine atom.

4,686,178

SILVER HALIDE PHOTOGRAPHIC EMULSION AND A PROCESS FOR THE PREPARATION THEREOF

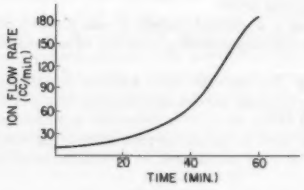
Chiba Honda; Koichi Ueda, and Akio Suzuki, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 592,705, Mar. 23, 1984, abandoned. This application Fed. 3, 1986, Ser. No. 825,766

Claims priority, application Japan, Mar. 28, 1983, 58-53043

Int. Cl.[4] G03C *1/02*

U.S. Cl. 430—569 **10 Claims**



1. A process for preparing a monodisperse core/shell type silver halide photographic emulsion comprising silver halide grains wherein an average silver iodide content in said grains is 0.5 to 10 mole % and each of said grains comprises a core portion having silver iodide of 30–40 mole % and a shell portion having no silver iodide, wherein silver halide grains are caused to grow from seed crystals having substantially no twin crystal by supplying silver ions and halide ions in the presence of protective colloid, and the supplying speeds of silver ions and halide ions are gradually increased as said grains grow and the supply of iodide ions in the halide ions is made before the completion of supply of silver ions and the content of ammonia contained in liquid phase emulsion is 0.3 to 2.0 normal and pAg is from 5 to 8 for the supply of iodide ions.

4,686,179

4- OR 6-SUBSTITUTED ALDOSTERONES, THEIR PRODUCTION AND USE IN IMMUNOASSAY

Masao Kono, Ibaraki; Taichitro Komeno, Osaka; Shoichi Ishihara, Toyonaka; Akira Yamauchi, Osaka, and Tadashi Okabayashi, Nishinomiya, all of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

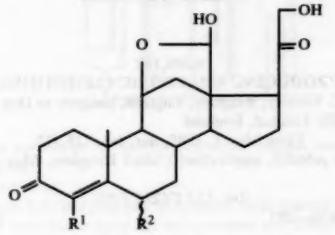
Division of Ser. No. 493,280, May 10, 1983, Pat. No. 4,623,485. This application May 3, 1985, Ser. No. 730,092

Claims priority, application Japan, May 10, 1982, 57-78847

Int. Cl.[4] G01N *33/534, 33/535, 33/74*

U.S. Cl. 435—7 4 Claims

1. In a method for immunoassay of aldosterone in an aldosterone-containing serum sample comprising (a) adding an anti-aldosterone serum immunologically prepared by the use of a conjugate of a first substituted aldosterone with a carrier protein as an immunogen and a tracer consisting of a second substituted aldosterone to said aldosterone-containing serum sample, (b) incubating the resultant mixture and (c) measuring at least one of the anti-aldosterone serum-bound second substituted aldosterone and the free second substituted aldosterone in the resulting mixture, the improvement wherein said first substituted aldosterone has the formula:



wherein either one of R^1 and R^2 is hydrogen and the other is $—S(CH_2)_mCOR^3$ or $—OCO(CH_2)_nCOR^3$, provided that when R^1 is hydrogen, R^2 is $—S(CH_2)_mCOR^3$ or $—OCO(CH_2)_nCOR^3$ and when R^2 is hydrogen, R^1 is $—S(CH_2)_mCOR^3$; m being an integer from 1 to 3, n being an integer from 1 to 5 and R^3 being hydroxyl, or its (18-20)-acetal 20,21-ketonide.

4,686,180

ONCO-FETAL SPECIFIC MONOCLONAL ANTIBODIES, METHODS OF PREPARATION AND USE

Joseph H. Coggin, Jr., Mobile, Ala., and William J. Payne, Jr., Indianapolis, Ind., assignors to South Alabama Medical Science Foundation, Mobile, Ala.

Filed Nov. 21, 1984, Ser. No. 673,794

Int. Cl.[4] G01N *33/53, 33/574*

U.S. Cl. 435—7 39 Claims

1. A process of preparing a hybridoma secreting oncofetal-specific monoclonal antibodies, which comprises:

(a) immunizing an animal with immunizing amounts of a non-proliferating syngeneic mid-gestation fetal cell preparation;

(b) isolating immunized lymphocytes from said animal; and

(c) fusing said lymphocytes under appropriate fusion conditions with an immortalizing cell line to thereby obtain said hybridoma.

35. A hybridoma cell line producing a monoclonal antibody having the following specificity characteristics:

(a) immune reactivity towards rodent mid-gestation antigens;

(b) immune reactivity towards human onco-fetal tumor antigens;

(c) substantially no immune reactivity towards rodent late gestational fetal tissue; and

(d) substantially no immune reactivity towards human normal tissue.

4,686,181

SPECIFIC BINDING ASSAY EMPLOYING ANTI-G6PDH AS LABEL

Valerio Doná, Via Gramsci, Italy, assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Nov. 19, 1984, Ser. No. 673,152

Claims priority, application Italy, Mar. 9, 1984, 47834 A/84

Int. Cl.[4] G01N *33/53;* C12Q *1/32;* C12N *9/04*

U.S. Cl. 435—7 17 Claims

1. In a homogeneous specific binding assay method for determining an analyte in a test sample,

wherein a reaction mixture is formed by combining said test sample with assay reagents including (a) a labeled conjugate comprising said analyte, or a binding analog thereof, coupled to a label component comprising an antibody, or fragment thereof, capable of binding to and inhibiting the catalytic activity of an enzyme, (b) a binding counterpart of said analyte, and (c) said enzyme, and

wherein said enzymatic activity is measured in said reaction mixture as a function of the amount of said analyte in the test sample,

the improvement which comprises employing glucose-6-phosphate dehydrogenase obtained from Leuconostoc mesenteroides

(EC 1.1.1.49) as said enzyme and employing antibody to said glucose-6-phosphate dehydrogenase as said label component which inhibits said glucose-6-phosphate dehydrogenase substantially 100 percent whereby the assay method has increased sensitivity and requires the use of less labeled conjugate.

4,686,182

METHOD AND KIT FOR DETECTING ANTIBIOTICS IN A LIQUID SAMPLE

James F. Drake, Minneapolis, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 17, 1984, Ser. No. 661,661

Int. Cl.[4] C12Q *1/36, 1/38, 1/02*

U.S. Cl. 435—24 12 Claims

1. A method of detecting a beta-lactam antibiotic in a liquid sample comprising:

a. forming a reaction medium by adding said sample to a predetermined amount of a dry reagent formulation comprising a D,D-carboxypeptidase, a substrate for said D,D-carboxypeptidase containing a carboxyterminal D-alanine, and a reagent system which produces a color change in the presence of D-alanine;

b. incubating said reaction medium for a predetermined period;

c. adding a quenching material to terminate the reaction;

d. observing the color of the reaction medium.

4,686,183

PROCESS FOR THE MANUFACTURE OF P-MENTH-8-ENE-1,2-DIOL

Wolf-Rainer Abraham, Braunschweig; Burkhard Stumpf, Königslutter, and Klaus Kieslich, Braunschweig, all of Fed. Rep. of Germany, assignors to Gesellschaft für Biotechnologische Forschung mbH (GBF), Braunschweig-Stöckheim, Fed. Rep. of Germany

Filed Oct. 17, 1983, Ser. No. 542,654

Claims priority, application Fed. Rep. of Germany, Oct. 26, 1982, 3239545

Int. Cl.[4] C12P *7/18;* C12N *1/14;* C12R *1/645*

U.S. Cl. 435—158 2 Claims

1. Process for the manufacture of a mixture of trans- and cis-p-menth-8-ene-1,2-diol, comprising fermenting racemic limonene with a p-menth-8-ene-1,2-diol producing fungus selected from the group consisting of *Gibberella cyanea* DSM 62719, *Diplodia gossypina* ATCC 10936, and *Corynespora cassiicola* DSM 62474 and 62475, and obtaining a mixture of trans- and cis-p-menth-8-ene-1,2-diol.

4,686,184

GENE TRANSFER VECTOR

Alfred Pühler, and Reinhard Simon, both of Bielefeld, Fed. Rep. of Germany, assignors to Lubrizol Genetics, Inc., Boulder, Colo.

Filed Jul. 1, 1983, Ser. No. 510,296
Int. Cl.[4] C12N *15/00, 1/20, 1/00;* C12R *1/41*
U.S. Cl. 435—172.3 27 Claims

1. A Tn-Mob vector comprising:

(a) A replicon functional in *E. coli;* and

(b) A Tn-Mob element comprising a transposon containing (i) a functional selection marker, and (ii) a Mob-site and oriT located in a region of said transposon that is not essential to transposability.

4,686,185

MICROORGANISM OF NEW SPECIES OF GENUS STREPTOMYCES AND USE THEREOF FOR PRODUCTION OF CHITINASE

Manji Wakunaga, Toyonaka, and Yasufumi Nishimura, Hiroshima, both of Japan, assignors to Wakunaga Kono Kabushiki Kaisha, Takata, Japan

Filed Jul. 26, 1985, Ser. No. 759,293
Claims priority, application Japan, Aug. 2, 1984, 59-163237; Aug. 2, 1984, 59-163238
Int. Cl.[4] C12N *9/36, 1/20;* C13L *3/00;* C12R *1/465;* C12P *19/28*
U.S. Cl. 435—206 3 Claims

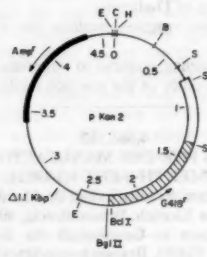
2. A method of producing chitinase, which comprises culturing a microorganism selected from the group consisting of Streptomyces sp. WAK-83 (FERM BP-826) and a microorganism derived therefrom, on a medium capable of growing said Streptomyces or said microorganism derived therefrom, and collecting said chitinase from the cultured product.

4,686,186

RECOMBINANT VECTOR AND EUKARYOTIC HOST TRANSFORMED THEREBY

William M. Sugden, Verona, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Sep. 26, 1984, Ser. No. 654,780
Int. Cl.[4] C12P *21/00;* C12N *7/00, 15/00*
U.S. Cl. 435—243 8 Claims



1. A recombinant plasmid, comprising:

a segment from a first plasmid which is not a lymphotrophic herpes virus segment and which facilitates the replication of the recombinant plasmid in a prokaryotic host;

a segment from a lymphotrohic herpes virus which is linked to said first plasmid segment such that it is capable of assisting in maintaining the recombinant plasmid as a plasmid if the recombinant plasmid is inserted into a eukaryotic host that has been transformed by the lymphotrophic herpes virus; and

a foreign eukaryotic gene component linked as part of the recombinant plasmid.

4,686,187

PROCESS FOR PREPARING PECTIN FROM PLANT TISSUES

Takuo Sakai, 13-6, Harayamadai, 4-Cho 590-01, and Tohoru Katsuragi, 2-52, Ohnoshibatakusha, 23, Ohnoshiba-Cho 593, both of Sakai-shi, Osaka, Japan

PCT No. PCT/JP80/00179, § 371 Date Apr. 3, 1981, § 102(e) Date Apr. 3, 1981, PCT Pub. No. WO81/00417, PCT Pub. Date Feb. 19, 1981
PCT Filed Aug. 8, 1980, Ser. No. 253,929
Claims priority, application Japan, Aug. 10, 1979, 54-102389
Int. Cl.[4] G08B *30/04*
U.S. Cl. 435—275 3 Claims

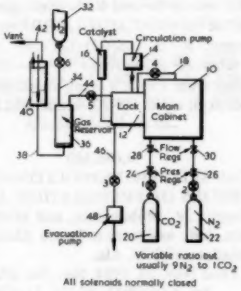
1. A process for preparing pectin comprising subjecting a plant tissue containing pectin substances to the action of a microorganism selected from *Kluyveromyces fragilis* IFO 0288 or *Kluyveromyces marxianus* IFO 0277 which possesses an activity of liberating pectin from a plant tissue or to the action of a culture broth or processed material of said microorganism which possesses an activity of liberating pectin from plant tissue to liberate pectin from said plant tissues, and recovering the pectin.

4,686,188

PRODUCING ANAEROBIC CONDITIONS

Donald C. Whitley, Keighley, England, assignor to Don Whitley Scientific Limited, England

Filed May 1, 1985, Ser. No. 729,372
Claims priority, application United Kingdom, May 4, 1984, 8411531
Int. Cl.[4] C12M *1/00*
U.S. Cl. 435—287 6 Claims



1. A method of producing anaerobic conditions comprising the steps of:

(a) providing a main chamber in selective communication with an associated entry/exit lock chamber,

(b) providing separate flows at prescribed relative rates of anaerobe-nurture gas, an inert gas, and an oxygen-consuming gas, and for which the inert gas has the greatest rate of flow,

(c) supplying such gas flow excluding oxygen-consuming gas to the main chamber and thence to the lock chamber via said selective communication for flushing and filling said chambers therewith,

(d) injecting into at least the lock chamber a prescribed volume of oxygen consuming gas; and then

(e) further including providing a catalyst in communication with at least said lock chamber and subjecting the contents of the lock chamber which includes said oxygen-consuming gas to said catalyst for oxygen-consuming action.

4,686,189

APPARATUS FOR BIOCONVERSION OF VEGETAL RAW MATERIAL

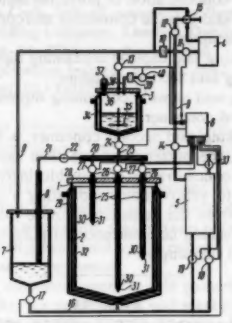
Jury V. Redikultsev, mikroraion "G", 19, kv. 113; Leonid A. Litvinenko, mikroraion "AB", 8 kv. 74; Evgeny L. Golovlev, mikroraion "V", 28, kv. 24; Ljudmila A. Golovleva, mikroraion "V", 28, kv. 24; Dmitry N. Chermensky, mikroraion "G", 7, kv. 67, all of Puschino, Moskovskaya oblast, and Georgy K. Skryabin, ulitsa Ulyanova, 3, kv. 124, Moscow, all of U.S.S.R.

Filed Sep. 14, 1984, Ser. No. 651,050

Claims priority, application U.S.S.R., Sep. 21, 1983, 3640901

Int. Cl.[4] C12M *1/36*

U.S. Cl. 435—289 **4 Claims**



1. An apparatus for bioconversion of vegetal raw material comprising:

a bioreactor;

a means for charging said bioreactor with vegetal raw material and discharging the end product and communicating with said bioreactor;

an inoculator communicating with said bioreactor;

a source of compressed air communicating with said bioreactor;

a steam source communicating with said bioreactor;

said compressed air source, inoculator and steam source producing gas-steam, a flow of inoculum and gas-liquid flow;

a pressure-sealed chamber for storing excess liquid displaceable from said bioreactor and communicating with said compressed air source, inoculator, steam source and bioreactor;

a liquid level control means disposed inside said pressure-sealed chamber;

a first pipe for conveying gas-steam flows and communicating said pressure-sealed chamber to the compressed air source;

a first valve provided in said first pipe;

a second pipe for conveying gas-steam flows and communicating said pressure-sealed chamber to the atmosphere;

a second valve provided in said second pipe;

a third pipe for conveying gas-steam flows and communicating said pressure-sealed chamber to said inoculator;

a third valve provided in said third pipe;

a fourth pipe for conveying gas-steam flows and communicating said pressure-sealed chamber to said steam source;

a fourth valve provided in said fourth pipe;

a fifth pipe for conveying gas-liquid flows and communicating said pressure-sealed chamber to said bioreactor;

a fifth valve provided in said fifth pipe;

a sixth pipe for conveying gas-liquid flows and communicating said pressure-sealed chamber to said steam source;

a sixth valve provided in said sixth pipe;

a distributor of said gas-steam, gas-liquid flows and the flow of inoculum connected to said liquid level control means and said inoculator;

a seventh pipe communicating said distributor of gas-steam, gas-liquid flows and the flow of inoculum to said liquid level control means;

a non-return valve provided in said seventh pipe;

an eighth pipe communicating said flow distributor to said inoculator;

a seventh valve provided in said eighth pipe;

a plurality of feeders arranged inside said bioreactor at different levels in terms of height thereof;

pipes equal in number to the number of said feeders and connecting said feeders to said flow distributor;

valves provided in said pipes and equal in number to the number of said pipes connecting said feeders to said flow distributor;

a pump arranged between said bioreactor and said steam source for circulating said gas-steam and gas-liquid flows; and

a control unit having a first output connected electrically to said first valve, a second output connected to said second valve, a third output connected to said third valve, a fourth output connected to said fourth valve, a fifth output connected to said fifth valve, a sixth output connected to said sixth valve, a seventh output connected to said seventh valve, an eighth output connected to said pump, a group of outputs connected to said valves provided in said pipes connecting said feeders to said distributor of gas-steam, gas-liquid flows and the flow of inoculum, and said control unit generating signals to open and close said valves and to energize and deenergize said pump for circulating and blocking said gas-steam, gas-liquid flows and the flow of inoculum.

4,686,190

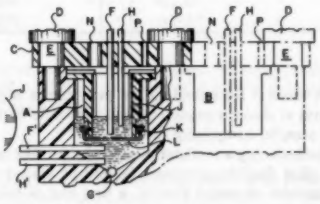
DEVICE USEFUL FOR GROWING AND/OR TESTING BIOLOGICAL MATERIALS

Eva B. Cramer, Port Washington; Linda C. Milks; Gregory P. Conyers, both of Brooklyn; Andrew Valenti, Uniondale, and Antonio Perez, Flushing, all of N.Y., assignors to The Research Foundation of State University of New York, Albany, N.Y.

Filed Feb. 19, 1986, Ser. No. 831,147

Int. Cl.[4] C12M *1/34*

U.S. Cl. 435—291 **30 Claims**



1. An apparatus useful for the study of biological cell migration and for the measurement of electrical resistance across a monolayer of cells which comprises, an internal chamber, an external chamber, said internal chamber being a cylinder open at both ends, a substrate provided across and attached to one end of said internal chamber on which are growing a confluent layer of cells, said internal chamber being positioned within said external chamber such that said layer of cells on said substrate is contacted by a first fluid or solution at its basal aspect and by a second fluid or solution at its apical aspect within said chambers so that an electrical current may flow through said substrate and layer of cells, a pair of bridges consisting of one current passing bridge and one voltage recording bridge positioned above said layer within said internal chamber and an identical pair of said bridges located below said layer and substrate within said external chamber, said pair of bridges connected to circuit means for measuring voltage across said layer.

4,686,191

RECOMBINANT PLASMID CONTAINING HUMAN INTERFERON-BETA GENE

Seiga Itoh, Sagamihara; Tatsunari Nishi, Machida; Tamio Mizukami, Machida; Tadashi Matsumoto, Machida; Tetsuo Oka, Yokohama; Tadatsugu Taniguchi, and Haruo Sugano, both of Tokyo, all of Japan, assignors to Hakko Kogyo Co., Ltd. Kyowa and Juridical Foundation, Japanese Foundation for Cancer Research, both of Tokyo, Japan

Filed Dec. 22, 1982, Ser. No. 452,290

Claims priority, application Japan, Dec. 25, 1981, 56-21393

Int. Cl.[4] C12N *1/00, 15/00, 1/20;* **C12P** *21/00, 21/06, 21/02, 21/04, 19/34;* **C07H** *21/04*

U.S. Cl. 435—320 **1 Claim**

1. A recombinant plasmid wherein a DNA fragment coding for human interferon-β is inserted downstream from at least one tryptophan promoter, said plasmid being selected from the group consisting of plasmids pLE-3, pLV-1 and pMZ-2.

4,686,192

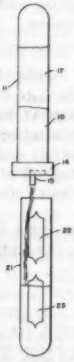
METHOD FOR DETECTING IMPURITIES IN AN OIL SAMPLE

David J. Fisher, North Adams, Mass., assignor to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Sep. 2, 1983, Ser. No. 529,154

Int. Cl.[4] G01N *1/10, 21/78, 33/26, 33/28*

U.S. Cl. 436—60 **3 Claims**



1. A method for detecting the presence of polychlorinated biphenyl at above a predetermined threshold concentration in an oil sample, comprising the steps of:

(a) introducing a predetermined volume of an oil sample into a first flexible container having at least two breakable capsules mounted therein, a first one of said capsules in said first container containing a reagent comprising naphthalene and diethylene glycol dimethyl ether and a second one of said capsules in said first container containing a reagent comprising sodium, in amounts sufficient to completely convert a predetermined threshold amount of polychlorinated biphenyl, as established by said predetermined threshold concentration and said predetermined sample volume, to chloride ions and biphenyl, said first container having means for separating an aqueous layer from an oil layer into a second flexible container;

(b) breaking said capsule containing naphthalene and diethylene glycol dimethyl ether in said first container;

(c) then shaking said first container;

(d) breaking said capsule containing sodium in said first container;

(e) then shaking said first container;

(f) transferring a predetermined volume of an aqueous buffer/acid solution contained in said second container to said first container;

(g) then shaking said first container;

(h) separating the resulting aqueous layer from the resulting oil layer by transferring the aqueous layer through said separating means into said second container, said second container having at least two breakable capsules mounted therein, a first one of said capsules in said second container containing a reagent comprising mercuric nitrate and a second one of said capsules in said second container containing a reagent comprising diphenyl carbazone, said mercuric nitrate and said diphenyl carbazone being present in amounts sufficient to cause a positive reaction if the concentration of chlorides in said aqueous layer is greater than an amount corresponding to said predetermined threshold concentration of polychlorinated biphenyl;

(i) breaking said capsule containing mercuric nitrate in said second container;

(j) then shaking said capsule containing diphenyl carbazone by shaking said second container;

(k) breaking said capsule containing diphenyl carbazone in said second container; and

(l) then shaking said second container, a blue-violet color indicating the presence of less than said predetermined threshold concentration of polychlorinated biphenyl and a colorless to yellow color indicating a positive reaction resulting from the presence of more than said predetermined threshold concentration of polychlorinated biphenyl in said oil sample.

4,686,193

BETA-D-GALACTOSE DERIVATIVES AND THEIR USE

Cenek Kolar, Marburg, Fed. Rep. of Germany, assignor to Behringwerke Aktiengesellschaft, Marburg, Fed. Rep. of Germany

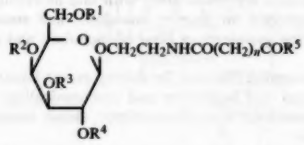
Filed May 27, 1983, Ser. No. 498,732

Claims priority, application Fed. Rep. of Germany, May 29, 1982, 3220427

Int. Cl.[4] G01N *33/536;* **C07H** *15/04*

U.S. Cl. 436—536 **6 Claims**

1. A compound of the formula I



in which

R^1 and R^2 each denote a hydrogen atom or an acetyl or benzoyl or benzyl group,

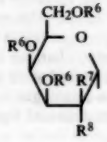
Rhu **1** and R^2 together denote an alkylidene or benzylidene protective group,

R^4 denotes a hydrogen atom, an acetyl or benzoyl or benzyl group or a 2,3,4-tri-O-benzyl-α-L-fucopyranosyl or α-L-fucopyranosyl radical,

R^5 denotes H, OH, NH_2, $NHNH_2$, N_3, -O-alkyl, -O-aryl, $NH—(CH_2)_mNH_2$, where

m=2–5, lysine, polylysine or a carrier,

n denotes a number from 1 to 10 and R^3 denotes a hydrogen atom, an acetyl or benzoyl or benzyl group or an α-D-glycopyranosyl radical of the general formula II,



in which

R^6 denotes a hydrogen atom or an acetyl or benzoyl or benzyl group,

R^7 denotes a hydrogen atom or halogen and

R^8 denotes a hydrogen atom, an acetyloxy or benzoyloxy or benzyloxy group or an azido, amino, acetamido or hydroxyl group.

4,686,194

SERIOIMMUNOLOGICAL PROCESS FOR DETERMINING THE IN-VIVO EFFECTIVENESS OF CYTOSTATIC AGENTS

Dezső S. Bartos, Solingen, Fed. Rep. of Germany, and Denis Fitzpatrick, County Cork, Ireland, assignors to Bartos Patent Development & Holding Company, Limited, Dublin, Ireland

Filed Apr. 14, 1983, Ser. No. 485,068

Claims priority, application Ireland, Apr. 21, 1982, 942/82

Int. Cl.[4] G01N *33/536*

U.S. Cl. 436—536 **8 Claims**

1. A process for the determination of the in vivo effectiveness of a cytostatic agent against immunological active tumors comprising the steps of

(a) assaying for a marker, an immune parameter, or a mixture thereof in a sample of a serum of a patient having an immunologically active tumor, said marker, parameter, or mixture thereof being produced by the patient, not by the tumor, in response to the tumor,

(b) administering a cytostatic agent to said patient,

(c) assaying thereafter for up to 3 days said marker, immune parameter or mixture thereof in further samples of the serum of the same patient, and

(d) comparing the results of the measurements of steps (a) and (c) to determine the in-vivo effectiveness of the cytostatic agent administered in step (b),

wherein an increase in the marker, immune parameter or mixture thereof in step (c) indicates therapeutic effectiveness of the cytostatic agent.

4,686,195

METHOD AND COMPOSITION FOR THE MANUFACTURE OF GRADIENT INDEX GLASS

Masayuki Yamane, Kawasaki, Japan, assignor to University of Rochester, Rochester, N.Y.

Filed Jan. 16, 1986, Ser. No. 820,486

Int. Cl.[4] C03C *3/00, 13/04*

U.S. Cl. 501—12 **14 Claims**

1. A method of manufacturing gradient index glass comprising the steps of:

(1) preparing either (a) a first solution of alkoxysilane with an aqueous source of boron to which an acid catalyst has been added, allowing said solution to cool, adding an aqueous solution of a first metal salt as a source of index modifier cations to form a mixture wherein said first metal salt will yield a high refractive index in said glass and pouring said mixture into a mold, or (b) a second alcoholic solution of alkoxysilane/alkoxyborine, allowing said solution to cool, adding an aqueous solution of a first metal salt as a source of index modifier cations to form a mixture wherein said first metal salt will yield a high refractive index in said glass and pouring said mixture into a mold;

(2) allowing sufficient time for said mixture to form a gel;

(3) removing said gel from said mold;

(4) drying said gel until it is reduced to approximately $\frac{1}{3}$ of its size if the alcoholic solution is used;

(5) immersing said gel in an aqueous salt bath comprising a second metal salt as a source of index modifier cations wherein said second metal salt will yield a low refractive index in said glass and wherein the metal of said second metal salt comprise elements different from said first metal and wherein said second metal cations have a valence unequal to the index modifier cations of said first metal salt;

(6) removing said gel from said bath;

(7) drying said gel;

(8) dessicating said gel; and

(9) densifying said gel at a temperature around the glass transition point temperature.

4,686,196

PHOTOTROPIC GLASS WITH A REFRACTIVE INDEX GREATER THAN OR EQUAL TO 1.59, AN ABBE NUMBER GREATER THAN OR EQUAL TO 44 AND A DENSITY LESS THAN OR EQUAL TO 3.0 G/CM^3

Georg Gliemeroth, Mainz-Finthen; Ludwig Ross, Kelin-Winternheim; Uwe Eichhorn; Eva G. Hoelzel, both of Mainz-Finthen, and Burkhard Speit, Mainz-Mombach, all of Fed. Rep. of Germany, assignors to Schott Glaswerke, Mainz, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 469,651, Feb. 25, 1983, abandoned. This application Feb. 13, 1986, Ser. No. 828,918

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1982, 3206958

Int. Cl.[4] C03C *4/06*

U.S. Cl. 501—13 **18 Claims**

3. A phototropic glass in which the carriers of phototropism are precipitates containing silver, halogens and optional phototropy sensitizers and which has a refractive index n_d equal to or higher than 1.59, an Abbe number equal to or greater than 44 and a density equal to or less than 3.0 g/cm^3, consisting essentially of, in % by weight on an oxide basis:

SiO_2	40–50
B_2O_3	15–18
Al_2O_3	2.9–3.5
Li_2O	6.0–7.5
Na_2O	0.06–0.08
K_2O	2.7–3.0
MgO	4.0–5.0
CaO	1.5–2.0
SrO	0.0–0.1
BaO	4.5–5.5
ZnO	0.0–0.1
TiO_2	4.5–5.5
ZrO_2	3.0–3.5
Nb_2O_5	5.0–7.0
La_2O_3	0.0–0.1
PbO	0.1–0.5
Er_2O_3	0.1–0.3

the total of the foregoing oxides being 100 wt. %, and in addition, phototropically effective amounts of Ag_2O, a halogen and optional phototropy sensitizers.

4,686,197

CATALYST DEMETALLIZATION AND PROCESS FOR USING DEMETALLIZED CATALYST

Frank J. Elvin, Kenner, La., assignor to ChemCat Corporation, New Orleans, La.

Filed Jul. 2, 1986, Ser. No. 881,334

Int. Cl.[4] B01J *38/54*

U.S. Cl. 502—22 **16 Claims**

1. In a process for demetallizing a catalyst contaminated with at least one contaminant metal while promoting hydrocarbon cracking of a feedstock containing said contaminating metal, said process including the steps of contacting said catalyst at elevated temperature with at least one chlorine-containing component to form a chlorinated catalyst and contacting said chlorinated catalyst with at least one liquid aqueous composition to produce a demetallized catalyst having a reduced content of said contaminant metal, the improvement comprising utilizing a catalyst comprising at least one synthetic zeolite capable of promoting said hydrocarbon cracking; and cooling said chlorinated catalyst prior to the first contacting of said chlorinated catalyst with said liquid aqueous composition, said liquid aqueous composition being substantially free of ammo-

nium ions thereby forming a demetallized catalyst with improved hydrocarbon cracking catalytic activity.

4,686,198

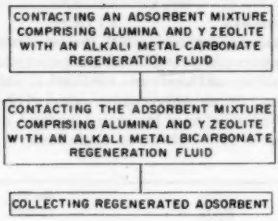
METHOD FOR REGENERATING ADSORBENT MIXTURE OF ALUMINA AND ZEOLITE FOR ADSORPTION OF AMMONIA

J. Finley Bush, Plum Borough, and Donald R. Mydock, Allegheny Township, Armstrong County, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Jun. 23, 1986, Ser. No. 877,638

Int. Cl.[4] B01J *38/64, 20/34;* **B01D** *15/00;* **C02F** *1/42*

U.S. Cl. 502—25 **13 Claims**


CONTACTING AN ADSORBENT MIXTURE COMPRISING ALUMINA AND Y ZEOLITE WITH AN ALKALI METAL CARBONATE REGENERATION FLUID
CONTACTING THE ADSORBENT MIXTURE COMPRISING ALUMINA AND Y ZEOLITE WITH AN ALKALI METAL BICARBONATE REGENERATION FLUID
COLLECTING REGENERATED ADSORBENT

1. An improved process for the regeneration of an adsorbent having ammonia adsorbed thereon and comprising a mixture of an alumina and a Y zeolite to regenerate said adsorbent to substantially its original capacity for adsorbing ammonia which comprises:

(a) treating the adsorbent with a saturated solution of an alkali metal carbonate to remove a substantial portion of the ammonia sorbed on the adsorbent mixture; and

(b) then treating the adsorbent in a second step with a saturated alkali metal bicarbonate solution to restore the ammonia adsorbent capacity of the adsorbent mixture to substantially its original capacity.

4. The process of claim **1** wherein said steps of treating said adsorbent with a saturated alkali metal carbonate solution and subsequently treating said adsorbent with a saturated alkali metal bicarbonate solution comprises passing said solutions through said adsorbent in a flow direction countercurrent to the flow of the liquid from which the ammonia was initially adsorbed onto said adsorbent.

13. An improved process for the regeneration of a bed of adsorbent having ammonia adsorbed thereon and comprising a mixture of an alumina and a Y zeolite to regenerate said adsorbent to substantially its original capacity for adsorbing ammonia which comprises:

(a) passing from 1 to 5 bed volumes of a saturated solution of sodium carbonate through said adsorbent bed at a temperature of from about 20° to 30° C. in a direction opposite to the normal direction of flow through said adsorbent bed to remove a substantial portion of the ammonia sorbed on the adsorbent mixture: and

(b) then passing from 1.5 to 4 bed volumes of a saturated sodium bicarbonate solution through said adsorbent bed at a temperature of from about 20° to 30° C. in a direction opposite to the normal direction of flow through said adsorbent bed to restore the ammonia adsorbent capacity of the adsorbent mixture to substantially its original capacity.

4,686,199

PROCESS FOR PRODUCING A CATALYST COMPONENT FOR POLYMERIZATION OF OLEFINS

Mamoru Tachikawa; Masato Sakuma; Satoshi Ueki, all of Saitama; Chihiro Imai, Kanagawa, and Tokuo Makishima, Saitama, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 27, 1985, Ser. No. 802,660

Claims priority, application Japan, Nov. 30, 1984, 59-251741

The portion of the term of this patent subsequent to Oct. 1, 2002, has been disclaimed.

Int. Cl.[4] C08F *4/64*

U.S. Cl. 502—104 **10 Claims**

10. A process of producing a catalyst component for polymerization of olefins which comprises contacting (a) a metal oxide with (b) a magnesium dihydrocarbyloxide, contacting the resulting contact product with (c) a halogen-containing compound selected from $SiCl_4$, $SnCl_4$, $AlCl_3$, BCl_3, $SbCl_3$, BI_3, PCl_3 and PCl_5, hydrogen halides, oxyhalides of S, N and P, halogenated hydrocarbons and halohydrosilanes and contacting the resulting contact product with (d) a titanium compound.

4,686,200

CATALYST FOR THE POLYMERIZATION OF OLEFINS

Minoru Terano; Hirokazu Soga; Masuo Inoue, and Katsuyoshi Miyoshi, all of Kanagawa, Japan, assignors to Toho Titanium Co., Ltd., Japan

Filed Nov. 18, 1986, Ser. No. 932,047

Claims priority, application Japan, Nov. 26, 1985, 60-263863; Dec. 25, 1985, 60-290838; Jan. 22, 1986, 61-10250

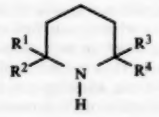
Int. Cl.[4] C08F *4/64*

U.S. Cl. 502—112 **67 Claims**

1. A catalyst for the polymerization of olefins which comprises:

(A) a solid catalyst component prepared by bringing a co-ground product of a substance (a) obtained by reacting magnesium with at least two molar proportion of an alkyl monohalide in the absence of a solvent but in the presence of iodine and a dialkyl phthalate (b) into contact with titanium tetrachloride;

(B) a disubstituted or tetrasubstituted piperidine derivative of the general formula:



wherein R^1 and R^3 are the same or different and each stands for an alkyl group and R^2 and R^4 both stand for hydrogen atoms or both stand for the same or different alkyl groups, and

(C) an organoaluminum compound of the general formula:

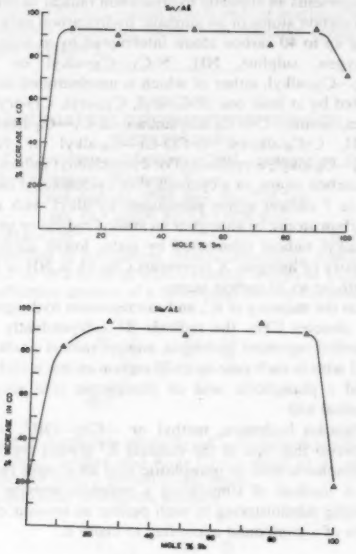
wherein R is an alkyl group, Q and Q' may be the same or different and each represents R or X, and X is a halogen atom.

4,686,201

ANTIFOULANTS COMPRISING TIN ANTIMONY AND ALUMINUM FOR THERMAL CRACKING PROCESSES

Randall A. Porter, and Larry E. Reed, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 632,934, Jul. 20, 1984, Pat. No. 4,545,893.
This application May 21, 1985, Ser. No. 736,592
Int. Cl.[4] B01J *31/14*; C10G *1/02*
U.S. Cl. 502—154 7 Claims



1. A composition, that is suitable for use as an antifoulant, comprising tin, antimony and aluminum, wherein said tin, antimony and aluminum are present in said composition in a form selected from the group consisting of elemental metals, organic, and inorganic compounds and in a form which is further characterized by being convertible to an oxide when placed in air having a temperature of about 700° C. and wherein the concentration of antimony and aluminum in said composition is in the range of about 20 mole percent to about 60 mole percent for both said antimony and said aluminum.

4,686,202

PREPARATION OF CATALYSTS FOR THE DETOXIFICATION OF WASTE GASES

Franz J. Broecker, Ludwigshafen, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 24, 1986, Ser. No. 842,994
Claims priority, application Fed. Rep. of Germany, Apr. 17, 1985, 3513726
Int. Cl.[4] B01J *35/06*
U.S. Cl. 502—300 13 Claims

1. A process for the preparation of a catalyst for the detoxification of waste gases, wherein the active catalyst components and the promoters are vaporized under reduced pressure and applied onto a carrier in the form of a net or woven fabric by vapor deposition under reduced pressure and the net or woven fabric coated with the catalyst metal by vapor deposition is then shaped to form catalyst packets.

4,686,203

METHOD FOR THE DIGESTION-PRECIPITATION OF HIGH ACTIVITY CATALYSTS

Michael J. Desmond, Cleveland Heights, and Marc A. Pepera, Northfield Center, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 679,094, Dec. 6, 1984, abandoned, which is a continuation-in-part of Ser. No. 504,717, Jun. 15, 1983, abandoned. This application Jun. 24, 1985, Ser. No. 747,585
Int. Cl.[4] B01J *23/72, 23/74*
U.S. Cl. 502—331 11 Claims

1. A method for preparing an iron-Group IB metal-containing metal oxide catalyst comprising;

(a) dissolving at least an iron salt and a salt of a Group IB metal in a polar organic solvent to form a solution;

(b) adding to said solution a precipitating agent capable of reacting with the metal species in said solution to form a precipitate of the metal thermally decomposable to the oxide, said precipitating agent having a solubility of less than that of the iron salt and Group IB metal salt and being from about 1×10^{-1} to about 1×10^{-6} moles of precipitating agent per 1000 grams of solvent at 25° C.;

(c) separating said precipitate from said polar organic solvent; and

(d) drying and calcining said precipitate to form said iron and Group IB metal-containing metal oxide catalyst.

4,686,204

SORBENT FOR REDUCING SULFUR OXIDE EMISSIONS FROM CATALYTIC CRACKING UNITS AND PROCESS FOR PRODUCING THE SORBENT

Zoltan C. Mester, Laguna Niguel, and Edward J. Aitken, Brea, both of Calif., assignors to Union Oil Company of California, Los Angeles, Calif.

Division of Ser. No. 781,755, Sep. 30, 1985, Pat. No. 4,642,177.
This application Jul. 31, 1986, Ser. No. 891,145
Int. Cl.[4] B01J *20/02, 20/08*
U.S. Cl. 502—406 24 Claims

1. A composition of matter comprising:

(a) a mixture of rare earth components derived from bastnaesite by treating said bastnaesite to remove at least about 50 weight percent fluorine, calculated as the element; and

(b) a porous, inorganic refractory oxide component.

4,686,205

INTAKE LIMITING FEED FOR ANIMALS CONTAINING SUCROSE OCTAACETATE

Norman L. Betz, Ballwin, and Larry W. Degoey, Ellisville, both of Mo., assignors to Ralston Purina Company, St. Louis, Mo.

Filed Jul. 7, 1983, Ser. No. 511,597
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—25 7 Claims

4. A method of self feeding animals by limiting feed intake to a predetermined amount which comprises feeding to said animals a feed comprising grain and sucrose octaacetate in an amount effective to limit intake of said composition.

4,686,206

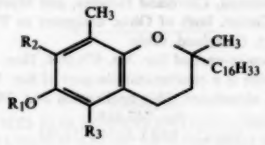
COMPOSITION FOR ACTIVATING FUNCTION OF PHAGOCYTES

Yasuhiro Katsuragi, Ibaraki; Naoki Matsuda, Kobe; Yoshiko Saiga, Minoh; Yasunobu Kobayashi; Masakazu Nakamura, both of Takatsuki, and Toshio Satoh, Tokushima, all of Japan, assignors to Sunstar Kabushiki Kaisha, Takatsuki, Japan

Filed Nov. 22, 1985, Ser. No. 800,768
Claims priority, application Japan, Nov. 28, 1984, 59-252247
Int. Cl.[4] A61K *31/70*
U.S. Cl. 514—27 4 Claims

1. Method of activating phagocytes function in an animal subject suffering from an infectious disease, in which the said subject requires such activation, which comprises administer-

ing an effective but non-toxic amount of a compound of the formula



wherein R_1 is a glucose or mannose group and R_2 and R_3 are independently hydrogen or methyl.

4,686,207

ERYTHROMYCIN A 11,12-CARBONATES AND METHOD OF USE

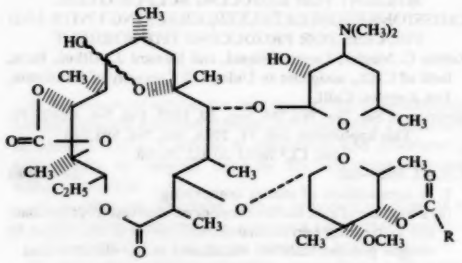
Leslie A. Freiberg, and David J. Bacino, both of Waukegan, Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed Nov. 12, 1985, Ser. No. 797,343

Int. Cl.[4] A61K *31/71;* **C07H** *17/08*

U.S. Cl. 514—29 **3 Claims**

1. A compound of the formula:



wherein R is lower alkyl, aryl, alkene, aryl halide, alkylamino and furanyl or pharmaceutically acceptable salts thereof.

3. A method of treating and preventing bacterial infections in humans and lower animals in need of such treatment, comprising administering to the human or lower animal a therapeutically effective amount of a compound according to claim **1**.

4,686,208

PHOSPHORYLATED GLYCOSYL-AMIDES, -UREAS, -CARBAMATES AND -THIOCARBAMATES AND METHOD OF USE

Oswald Lockhoff, Cologne; Bernd-Wieland Krüger, Wuppertal; Peter Stadler; Arnold Paessens, both of Haan; Gert Streissle, Wuppertal, all of Fed. Rep. of Germany; Peter Taylor, West Haven, Calif.; Hans-Joachim Zeiler, Velbert, and Karl-Georg Metzger, Wuppertal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

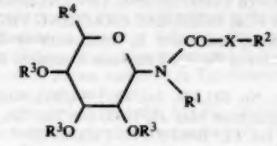
Filed Nov. 21, 1984, Ser. No. 673,811

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1983, 3342308; Feb. 2, 1984, 3403495

Int. Cl.[4] A61K *31/70;* **C07H** *5/06*

U.S. Cl. 514—42 **15 Claims**

1. A compound of the formula



in which

R^1 represents an aliphatic hydrocarbon radical having up to 40 carbon atoms or an aliphatic hydrocarbon radical having up to 40 carbon atoms interrupted by at least one of oxygen, sulphur, NH, N-C_1—C_{20}-alkyl or N-CO-C_1—C_{20}-alkyl, either of which is unsubstituted or substituted by at least one of C_6-aryl, C_{10}-aryl, C_{12}-aryl, halogen, amino, C_1—C_6-alkylamino, di-C_1—C_6-alkylamino, OH, C_1C_6-alkoxy, O-CO-C_1—C_6-alkyl or NH-CO-C_1—C_6-alkyl; a cycloalkyl or cycloalkenyl radical of 3 to 7 carbon atoms, or a cycloalkyl or cycloalkenyl radical of 3 to 7 carbon atoms substituted by alkyl with up to 8 carbon atoms; or an aryl or an aralkyl radical or an aryl or aralkyl radical substituted by nitro, lower alkyl, lower alkoxy or halogen, X represents Ch_2, O, S, NH or N-alkyl with up to 20 carbon atoms,

R^2 has the meaning of R^1, and can represent hydrogen when X denotes CH_2, the radicals R^3 independently of one another represent hydrogen, an acyl radical or alkyl radical with in each case up to 20 carbon atoms, a silyl radical and a phosphoric acid or phosphoric acid alkyl ester radical and

R^4 denotes hydrogen, methyl or $—Ch_2—OR^3$, with the proviso that one of the radicals R^3 always represents a phosphoric acid or phosphoric acid alkyl ester radical.

14. A method of stimulating a patient's immune system comprising administering to such patient an amount effective therefor of a compound according to claim **1**.

4,686,209

CERTAIN N-(SUBSTITUTED-AMINOSULFINYL)PHOSPHONAMIDOTHIOATE AND DITHIOATE PESTICIDES

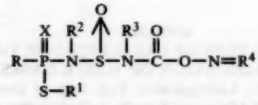
Mohamed A. H. Fahmy, Modesto, Calif., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 10, 1986, Ser. No. 817,633

Int. Cl.[4] A01N *57/04;* **C07F** *9/44*

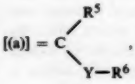
U.S. Cl. 514—116 **7 Claims**

1. A compound of the formula



(I)

wherein R and R^1 each is alkyl or alkenyl of up to six carbon atoms, phenyl or benzyl, R^2 is alkyl, alkenyl or alkynyl of up to six carbon atoms, or such alkyl substituted by phenyl; phenyl or phenyl substituted by one to three substituents selected from alkyl of one to six carbon atoms and halogen; R^3 is methyl; X is oxygen or sulfur, and R^4 is



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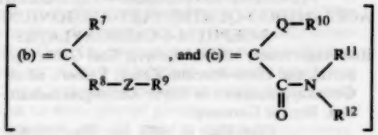


wherein R^5 is alkyl of one of five carbon atoms, Y is oxygen or sulfur and R^6 is alkyl of one to six carbon atoms.

4. A method for controlling insects and/or acarids at a locus that comprises subjecting them to an effective dosage of a compound of claim 1.

4,686,210

S-(OXOALKYL)TRITHIOPHOSPHONATE INSECTICIDES

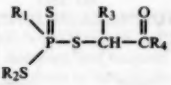
Charles G. Chavdarian, Martinez, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Apr. 22, 1985, Ser. No. 725,716

Int. Cl.[4] A01N *57/12*; **C07F** *9/40*

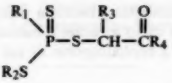
U.S. Cl. 514—125 **20 Claims**

1. A method of controlling insects comprising applying to said insect or to a locus at which control is desired an insecticidally effective amount of a compound having the formula



in which R_1 is methyl or ethyl; R_2 is C_3–C_6 branched alkyl; R_3 is hydrogen or methyl; and R_4 is C_1–C_4 alkyl; or R_3 and R_4 taken together form a trimethylene chain.

4. A compound having the formula



in which R_1 is methyl or ethyl; R_2 is C_3–C_6 branched alkyl; R_3 is hydrogen or methyl; and R_4 is C_1–C_4 alkyl; or R_3 and R_4 taken together form a trimethylene chain.

4,686,211

MEDICAL COMPOSITION FOR EXTERNAL APPLICATION

Kenji Hara, Utsunomiya; Hiromichi Takahashi, Kawasaki; Tetsuro Kamiya, Ichikaimachi, and Kaoru Tsujii, Utsunomiya, all of Japan, assignors to Kao Corporation, Tokyo, Japan

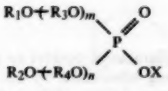
Filed Sep. 20, 1985, Ser. No. 778,226

Claims priority, application Japan, Oct. 11, 1984, 59-213152

Int. Cl.[4] A61K *31/66*

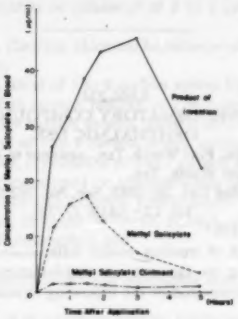
U.S. Cl. 514—148 **11 Claims**

1. A medical composition for external application which is capable of being percutaneously absorbed in high efficiency, which comprises an amount of a medically effective ingredient sufficient to produce a medical effect upon application to the skin, and a dialkyl phosphate of the formula (I):



(I)

in which R_1 and R_2 independently represent a hydrocarbon group having a 6–24 carbon atoms, R_3 and R_4 independently represent a hydrocarbon group having 2 to 6 carbon atoms, m and n independently represent a value of from 0 to 20, and X represents a hydrogen atom, or an alkali metal, ammonium, alkanoylammonium having two or three carbon atoms, alkylammonium having from 1 to 4 carbon atoms, a basic amino acid or morpholine.



4,686,212

STABLE SODIUM ASPIRIN TABLET COMPOSITIONS

Fred P. Ducatman, Westfield, and John D. Flanagan, Palisades Park, both of N.J., assignors to PharmaControl Corp., Englewood Cliffs, N.J.

Filed Aug. 13, 1985, Ser. No. 765,086

Int. Cl.[4] A61K *31/62*

U.S. Cl. 514—161 **9 Claims**

1. A stable sodium aspirin tablet composition consisting essentially of about 40 to about 90% dry, crystalline sodium aspirin and a plurality of tableting adjuvants, each of the tableting adjuvants being substantially anhydrous and essentially unreactive to sodium aspirin, the tableting adjuvants consisting essentially of from about 5 to about 25% of a substantially anhydrous binder and from about 0.1 to about 10% of hydrogenated animal or vegetable oil lubricant which is substantially free of fatty acids.

4,686,213

SUBSTITUTED 1,3,4,9-TETRAHYDROPYRANO(3,4-B)INDOLE-1-ACETIC ACIDS

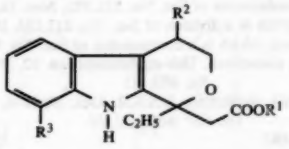
Eckhardt S. Ferdinandi, Princeton; Dominick Mobilio; Joseph P. Sabatucci, both of Plainsboro, and Leslie G. Humber, North Brunswick, all of N.J., assignors to American Home Products Corporation, New York, N.Y.

Filed Aug. 15, 1986, Ser. No. 896,998

Int. Cl.[4] A61K *31/62, 31/445, 31/40*; **C07D** *493/04*

U.S. Cl. 514—161 **15 Claims**

1. The compounds having the structure (I)



(I)

wherein R^1 is —H or lower alkyl containing 1 to 3 carbon atoms; R^2 is —NH_2, ,—NHCHO, —$NHCONH_2$, —OCH_3, oxo; R^3 is —H or lower alkyl containing 1 to 3 carbon atoms

and the pharmaceutically acceptable salts thereof when R^7 is —H.

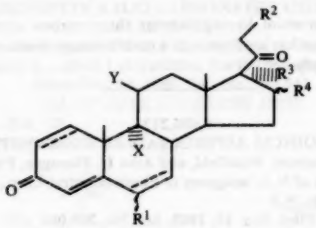
4,686,214

ANTI-INFLAMMATORY COMPOUNDS FOR OPHTHALMIC USE

John J. Boltralik, Fort Worth, Tex., assignor to Alcon Laboratories, Inc., Fort Worth, Tex.

Filed Oct. 30, 1985, Ser. No. 792,992
Int. Cl.[4] A61K *31/56*
U.S. Cl. 514—179 **2 Claims**

1. A method of treating ocular inflammation which comprises applying to the eye an anti-inflammatory effective amount of a compound of the following structure:



(I)

wherein:

X=a member of the group consisting of H and halogen;

Y=a member of the group consisting of H_2 H(OH), H(OAcyl) and O;

R^1=a member of the group consisting of H, CH_3 and halogen;

R^2=alkyl having 1–4 carbon atoms;

R^3=a member of the group consisting of H, OAcyl, Oalkyl, and CH_3;

R^4=a member of the group consisting of H and alkyl having 1–4 carbon atoms; and C_1–C_2 and C_6–C_7 are selected from a saturated and an unsaturated bond.

4,686,215

PHARMACEUTICAL COMPOSITION AND METHOD FOR TREATING TUMORS SUSCEPTIBLE TO 2-CARBAMOYLAZIRIDINE

Ivars Y. Kalvinsh, Rizhsky, and Elena B. Astapenok, Riga, both of U.S.S.R., assignors to Institut Organicheskogo Sinteza Akademii Nauk SSR, Riga, U.S.S.R.

Continuation of Ser. No. 581,238, Feb. 17, 1984, abandoned, which is a continuation of Ser. No. 321,933, Nov. 16, 1981, abandoned, which is a division of Ser. No. 217,253, Dec. 17, 1980, abandoned, which is a continuation of Ser. No. 844,426, Oct. 20, 1977, abandoned. This application Jan. 22, 1985, Ser. No. 693,171
Claims priority, application U.S.S.R., Oct. 29, 1976, 2418326
Int. Cl.[4] A61K *31/33*
U.S. Cl. 514—183 **13 Claims**

1. Method of treating a malignant tumor susceptible to 2-carbamoylaziridine, which comprises administering to a patient suffering from said malignant tumor, an anti-malignant tumor effective amount of 2-carbamoylaziridine.

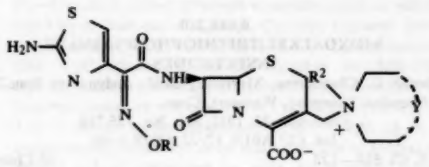
4,686,216

7-[2-(2-AMINOTHIAZOL-4-YL)-2-OXIMINO-ACETAMIDO-3-QUATERNARY-AMMONIUM-METHYL-3-CEPHEM-4-CARBOXYLATES

Rolf Angerbauer; Michael Boberg; Karl G. Metzger, all of Wuppertal, and Hans-Joachim Zeiler, Velbert, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

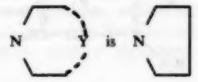
Filed May 6, 1985, Ser. No. 730,985
Claims priority, application Fed. Rep. of Germany, May 22, 1984, 3419013
Int. Cl.[4] A61K *31/545*; C07D *501/46*
U.S. Cl. 514—202 **4 Claims**

1. A cephalosporin of the formula



in which

R^1 is methyl,



and

R^2 is propyl; or a pharmaceutically acceptable salt thereof.

2. An antibacterial composition comprising an antibacterially effective amount of a compound or salt according to claim 1 and a diluent.

4. A method of combatting bacteria which comprises applying to such bacteria or to a bacteria habitat an antibacterially effective amount of a cephalosporin or salt according to claim 1.

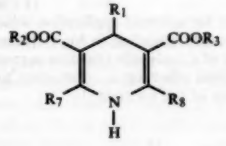
4,686,217

CALCIUM ANTAGONIST 2-FLUOROALKYL-1,4-DIHYDROPYRIDINES

Andrew J. G. Baxter, Keyworth; John Dixon, Belton; Kenneth J. Gould, Long Whatton, and Alan C. Tinker, Loughborough, all of England, assignors to Fisons plc, Ipswich, England

Filed Apr. 17, 1984, Ser. No. 601,309
Claims priority, application United Kingdom, Apr. 27, 1983, 8311519; Oct. 1, 1983, 8326362; Nov. 18, 1983, 8330852; Dec. 22, 1983, 8334285
Int. Cl.[4] A61K *31/455*; C07D *211/90, 401/04, 413/04*
U.S. Cl. 514—210 **10 Claims**

1. A compound of formula I,



I

in which

R_1 represents benzolfurazanyl, pyridyl or phenyl, the pyridyl or phenyl being substituted by one or more of the groups halogen, nitro, —CN, —OR_9, —$S(O)_pR_9$, or alkyl C_1 to C_6 optionally substituted by halogen,

p is 0, 1 or 2,

R_2 and R_3, which may be the same or different, each represent hydrogen; alkyl C_1 to C_6 optionally substituted by one or more of the groups halogen, cyano, $—XR_4$, $—NR_5R_6$ or phenyl; cycloalkyl C_3 to C_8 optionally substituted by alkyl C_1 to C_6; oxetanyl, azetidinyl, piperidinyl or tetrahydropyranyl, each of which is optionally substituted by alkyl C_1 to C_6, the alkyl in turn optionally being substituted by one or more phenyl groups,

R_5 and R_6, which may be the same or different, each represent alkyl C_1 to C_6 optionally substituted by phenyl,

one of R_7 and R_8 represents alkyl C_1 to C_6 and the other represents alkyl C_1 to C_6 substituted by only one fluorine atom;

X is O or S,

R_4 is alkyl C_1 to C_6 or phenyl,

R_9 is alkyl C_1 to C_6,

and pharmaceutically acceptable acid addition salts of those compounds containing a basic nitrogen atom.

10. A pharmaceutical composition for the treatment of renovascular, malignant or essential hypertension, pulmonary hypertension, vasospastic angina, chronic stable angina or congestive heart failure, said composition containing an amount of a compound according to claim 1 effective for said treatment, in admixture with a pharmaceutically acceptable adjuvant, diluent, or carrier.

4,686,218
USE OF 6-CHLORO-3-METHYL-1H-2,3,4,5-TETRAHYDRO-3-BENZAZEPINE-N-OXIDE, AS A PRODRUG

Robert M. DeMarinis, Ardmore, and Kenneth M. Straub, Philadelphia, both of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Jan. 30, 1985, Ser. No. 696,377
Int. Cl.[4] A61K *31/55*
U.S. Cl. 514—213 **4 Claims**

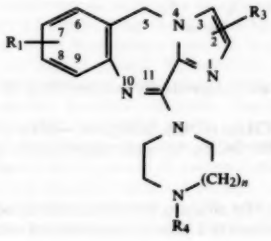
1. A method of producing α_2-antagonistic activity in a patient in need thereof comprising administering internally to said patient an effective therefor, nontoxic quantity of 6-Chloro-3-methyl-1H-2,3,4,5-tetrahydro-3-benzazepine-N-oxide as a prodrug.

4,686,219
11-(PIPERAZIN- OR HOMOPIPERAZIN-1-YL)-5H-IMIDAZO-(2,1-C(1,4)BENZODIAZEPINES USEFUL AS ANTI-ALLERGICS

Gerhard Walther, Bingen; Claus Schneider, Ingelheim am Rhein; Karl-Heinz Weber, and Armin Fügner, both of Gau-Algesheim, all of Fed. Rep. of Germany, assignors to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

Continuation of Ser. No. 645,009, Aug. 28, 1984, abandoned. This application Feb. 7, 1986, Ser. No. 827,849
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1983, 3331858
Int. Cl.[4] A61K *31/33*; C07D *487/14*
U.S. Cl. 514—220 **7 Claims**

1. A compound of the formula



wherein

R_1 is hydrogen, fluorine, chlorine, bromine, trifluoromethyl, hydroxyl, amino, methylsulfonamido, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 3 carbon atoms, (alkyl of 1 to 3 carbon atoms)thio or (alkanoyl of 2 to 4 carbon atoms-)amino;

R_3 is hydrogen, fluorine, chlorine, bromine or alkyl of 1 to 3 carbon atoms;

R_4 is hydrogen, alkyl of 1 to 4 carbon atoms, hydroxy(alkyl of 2 to 4 carbon atoms), (alkoxy of 1 to 2 carbon atoms)-(alkyl of 2 to 4 carbon atoms), alkenyl of 3 to 6 carbon atoms, alkynyl of 3 to 6 carbon atoms, cycloalkyl of 3 to 7 carbon atoms, (cycloalkyl of 3 to 7 carbon atoms)-(alkyl of 1 to 3 carbon atoms) or (unsubstituted or substituted phenyl)-(alkyl of 1 to 3 carbon atoms) where the substituent is fluorine, chlorine, bromine, methyl, methoxy, hydroxyl or trifluoromethyl; and

n is 1 or 2;

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

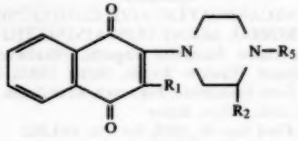
7. The method of suppressing allergic reactions in a warm-blooded animal in need thereof, which comprises perorally, parenterally, rectally or by inhalation administering to said animal an effective antiallergic amount of a compound of claim 1.

4,686,220
SUBSTITUTED 2-[B-SUBSTITUTED-AMINO)-ETHYLAMINO]-1,4-NAPHTHALENEDIONES FOR TREATING ASTHMA, ALLERGIC DISEASES AND INFLAMMATION IN WARM-BLOODED ANIMALS

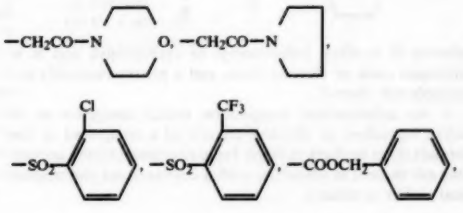
Jeffrey B. Medwid, Rockland; Lawrence W. Torley, Washingtonville, both of N.Y., and Andrew S. Tomcufcik, Bergen, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 19, 1985, Ser. No. 811,122
Int. Cl.[4] A61K *31/505*; C07D *403/04, 413/12, 403/06*
U.S. Cl. 514—252 **13 Claims**

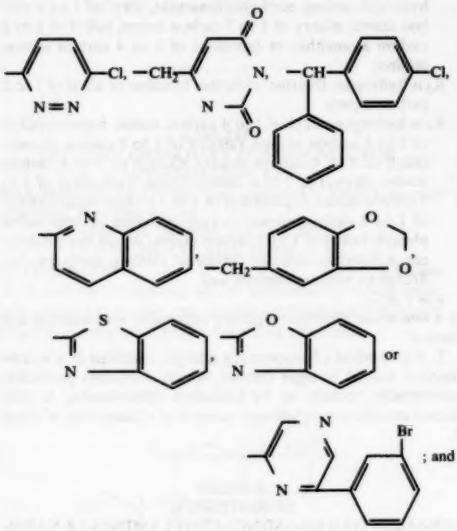
1. A compound selected from the group consisting of those of the formula:



wherein R_1 is halogen, hydroxy, alkyl(C_1–C_4), alkoxy(C_1–C_3), $—NHCOCH_3$ or $—N(COCH_3)_2$, R_2 is hydrogen or alkyl(C_1–C_4), R_5 is hydrogen, formyl, acetyl, —COOalkyl(C_1–C_4), $—COOCH_2C(halogen)_3$, $—CO(CH_2)_7CH{=}CH(CH_2)_7CH_3$, $—CON[alkyl\text{-}(C_1–C_3)]_2$, phenyl, benzyl, 2-, 3- or 4-pyridinyl, 2-pyrimidinyl, 2-, 3- or 4-halobenzoyl, 2-, 3- or 4-alkyl(C_1–C_6)-benzoyl, monosubstituted phenyl (wherein the substituents may be *ortho, meta* or *para* and are halogen or trifluoromethyl), monosubstituted phenyl carboxamide (wherein the substituents may be *meta* or *para* and are halogen or trifluoromethyl),



-continued



the pharmacologically acceptable acid-addition salts thereof.

11. A method of treating asthma and allergic diseases in a warm-blooded animal which comprises administering to said animal an effective amount of a compound of claim **1**.

12. A method of treating inflammation in a warm-blooded animal which comprises administering to said animal an effective amount of a compound of claim **1**.

4,686,221

QUINOLINECARBOXYLIC ACID COMPOUNDS AND ANTIMICROBIAL AGENT CONTAINING THE SAME

Toshio Uno, Daito; Masahiro Taguchi, Hirakata; Toshimi Okuno, Osaka; Hirosato Kondo, Suita; Mikio Sotomura, Kobe, and Goro Tsukamoto, Toyonaka, all of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

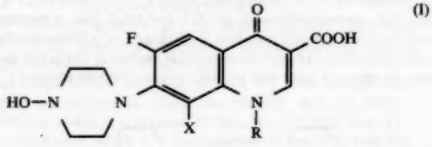
Filed Sep. 30, 1986, Ser. No. 913,382

Claims priority, application Japan, Oct. 1, 1985, 60-219379; May 2, 1986, 61-102568

Int. Cl.[4] A61K *31/495;* **C07D** *401/04*

U.S. Cl. 514—254 **12 Claims**

1. A quinolinecarboxylic acid compound of the formula:



(I)

wherein R is ethyl, 2-fluoroethyl or cyclopropyl, and X is hydrogen atom or fluorine atom, and a pharmaceutically acceptable salt thereof.

7. An antimicrobial composition which comprises as an active ingredient an effective amount of a compound of the formula (I) as set forth in claim **1** or a pharmaceutically acceptable salt thereof in admixture with a conventional pharmaceutical carrier or diluent.

4,686,222

ARALKYLAMINOETHANOL HETEROCYCLIC COMPOUNDS

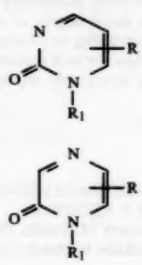
Joseph G. Atkinson, Montreal, Canada; John J. Baldwin, Gwynedd Valley, and David E. McClure, Lansdale, both of Pa., assignors to Merck & Co., Inc. and Merck Sharp & Dohme (I.A.) Corp., both of Rahway, N.J.

Division of Ser. No. 361,673, Mar. 25, 1982, Pat. No. 4,568,679, which is a division of Ser. No. 219,725, Dec. 23, 1980, Pat. No. 4,358,455. This application Oct. 3, 1985, Ser. No. 783,972

Int. Cl.[4] A61K *31/505, 31/495;* **C07D** *239/36, 241/18*

U.S. Cl. 514—255 **13 Claims**

1. A compound of the formula:

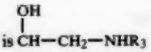


(a)

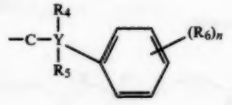
(b)

tautomers, pharmaceutically acceptable salts and individual enantiomers thereof wherein

R_1 is H or OH,



wherein R_3 is



wherein:

R_4 and R_5 are independently selected from H and C_1–C_3 alkyl,

Y is CH_2, $(CH_2)_2$, $(CH_2)_3$, $(CH_2)_4$ or —CH_2—O—

R_6 is H, OH, OCH_3, halogen, methylenedioxy or C_1–C_3 alkyl and

n is 1 or 2.

12. A method for effecting bronchodilation by administering an effective amount of a claim **1** compound in a suitable dosage form.

4,686,223

SUBSTITUTED 5-PHENYLTHIO-6-AMINO-PYRIMIDINONES, A PROCESS FOR THEIR PREPARATION AND THEIR USE, AND FORMULATIONS CONTAINING THESE COMPOUNDS

Erich Cohnen, Jork, and Ben Armah, Hamburg, both of Fed. Rep. of Germany, assignors to Beiersdorf Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

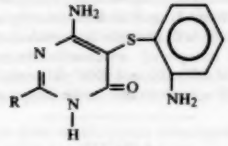
Division of Ser. No. 503,469, Jun. 13, 1983, Pat. No. 4,594,419. This application Dec. 4, 1985, Ser. No. 804,423

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1982, 3222914

Int. Cl.[4] A61K *31/505*

U.S. Cl. 514—272 **3 Claims**

1. A method of effecting diuresis, saluresis or uricosuric activity in a warm-blooded animal requiring such treatment which comprises administering to said animals a diuretic, saluretic or uricosuric effective amount of a substituted 5-phenylthio-6-amino-pyrimidinone of the formula



in which R denotes an amino or hydroxyl group, and its tautomers and acid addition salts either alone, or in admixture with a diluent or in the form of a medicament.

4,686,224

OXINDOLE ANTIINFLAMMATORY AGENTS

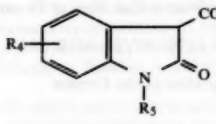
Lawrence S. Melvin, Jr., Ledyard, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 666,953, Oct. 31, 1984, Pat. No. 4,644,005. This application Aug. 6, 1985, Ser. No. 762,998

Int. Cl.[4] C07D *209/42, 419/12;* A61K *31/40*

U.S. Cl. 514—275 **15 Claims**

1. Compounds of the formula



and the pharaceutically acceptable base salts thereof, wherein R_5 is selected from the group consisting of hydrogen and alkyl containing one to three carbon atoms; R_3 is selected from the group consisting of phenyl, fluorophenyl, trifluoromethylphenyl, methoxyphenyl, chlorophenyl, difluorophenyl, pyridyl, 2-thiazolyl, 5-methyl-2-thiazolyl, 5-methyl-3-isoxazolyl, 2-thiadiazolyl and 2-pyrimidyl; and R_4 is a substituent at the 5, 6 or 7-position of the oxindole selected from the group consisting of alkanoyl having two to six carbon atoms, cycloalkanoyl having four to six carbon atoms, 2-thenoyl, benzoyl, phenylacetyl and substituted benzoyl wherein said substituent is selected from the group consisting of fluoro, chloro, methyl and cyano.

4,686,225

VINPOCETINE FOR PULMONARY HEMORRHAGE AND EDEMA

Gary A. King, Lawrenceville, N.J., assignor to American Home Products Corporation (Del.), New York, N.Y.

Filed Apr. 29, 1986, Ser. No. 857,202

Int. Cl.[4] A61K *31/44*

U.S. Cl. 514—283 **4 Claims**

1. A method for inhibiting pulmonary hemorrhage and edema associated with a intracranial syndrome in a mammal in need of such treatment which comprises administering to the mammal an effective amount of vinpocetine.

4,686,226

SUBSTITUTED BENZO[B]FURO- AND BENZO[B]THIENO QUINOLIZINES

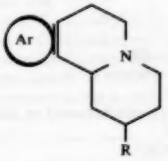
Joel R. Huff, Lederach; John J. Baldwin, Gwynedd Valley; Yojiro Sakurai, Lansdale; Joseph P. Vacca, Telford, and James P. Guare, Jr., Quakertown, all of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 3, 1985, Ser. No. 771,927

Int. Cl.[4] C07D *491/497, 495/14;* A61K *31/38, 31/435*

U.S. Cl. 514—285 **12 Claims**

1. A compound of structural formula:



or a pharmaceutically acceptable salt thereof wherein Ar represents an aromatic group selected from X,Y-benzo[b]furo-, X,Y-benzo[b]thieno-, and; wherein

X and Y are independently:

(1) hydrogen,

(2) halo,

(3) hydroxy,

(4) C_{1-3}alkoxy, or

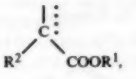
(5) C_{1-6}alkyl;

R is

(1)

wherein R^1 is hydrogen or C_{1-5} alkyl, either straight or branched chain;

(2)



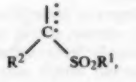
wherein R^2 is

(a) hydrogen,

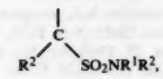
(b) C_{1-5} alkyl, or

(c) C_{1-5} alkylidene;

(3)



(4)



wherein R^1 and R^2 can be joined together to form pyrrolidine or piperidine;

(5)

wherein Q is
(a) O, or
(b) N—OR^1;

(6)

wherein Z is
(a) —OR^3 or —SR^3
(b) —NR^2R^3, wherein R^3 is
(i) H,
(ii) C_{1-5} alkyl, unsubstituted or substituted with
(1) —OH
(2) —$COOR^1$,
(3) —SO_2R^2,
(4) —$N(R^2)SO_2R^2$,
(iii) —$COOR^2$,
(iv) —SO_2R^2,
(v) $SO_2NR^1R^2$;

R^4 is
(a) C_{1-5} alkyl, or
(b) C_{1-5} alkylidene; and

the broken lines represent possible double bonds.

4,686,227

IMIDAZOISOQUINOLINE COMPOUNDS USEFUL AS ANTI-ULCERATIVE AGENTS

Ikuo Ueda, Uenohigashi; Youichi Shiokawa, Hozumidai; Masayuki Kato, Minoo; Nobukiyo Konishi, Aotanai, and Atsushi Akahane, Midorigaoka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

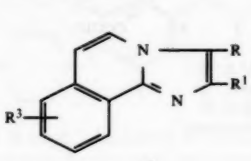
Filed Jun. 17, 1985, Ser. No. 745,638

Claims priority, application United Kingdom, Jun. 18, 1984, 8415540

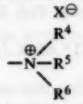
Int. Cl.[4] A61K *31/395;* **C07D** *471/04, 405/04*

U.S. Cl. 514—292 **9 Claims**

1. A compound of the formula:



wherein R^1 is lower alkyl,
R^3 is hydrogen, halogen or phenyl(lower)alkoxy, and
R is lower alkanoyl, nitroso, amino, carboxy, lower alkoxycarbonyl, carbamoyl, hydroxycarbamoyl, haloformyl, aminomethyleneamino which may be substituted with cyano or lower alkyl, iminomethylamino which may be substituted with cyano or lower alkyl, or a group of the formula: —A—R^2 in which
A is lower alkylene and
R^2 is di(lower)alkylamino, cyano, lower alkoxy, lower alkynyloxy, lower alkenyloxy, lower alkylthio, amino(lower)alkylthio, lower alkylsulfinyl, lower alkylsulfonyl, carboxy, lower alkoxycarbonyl, carbamoyl, hydroxycarbamoyl, hydroxy, lower alkanoyloxy, hydrogen or a group of the formula:



in which
R^4, R^5 and R^6 are each lower alkyl and
X is an acid residue,
and pharmaceutically acceptable salts thereof.

6. An anti-ulcer composition comprising an amount of a compound of claim **1** or pharmaceutically acceptable salt thereof such that it will provide an antiulceratively effective amount of said compound when administered to a warm blooded animal in association with a pharmaceutically acceptable, substantially non-toxic carrier or excipient.

4,686,228

QUINOLINE THERAPEUTIC AGENTS

Simon F. Campbell, and John D. Hardstone, both of Deal, England, assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 515,095, Jul. 19, 1983, Pat. No. 4,656,174. This application Oct. 30, 1986, Ser. No. 925,029

Claims priority, application United Kingdom, Jul. 24, 1982, 8221457

Int. Cl.[4] A61K *31/47;* **C07D** *401/04*

U.S. Cl. 514—307 **3 Claims**

1. 4-Amino-6,7-dimethoxy-2-[6,7-dimethoxy-1,2,3,4-tetrahydroisoquinol-2-yl]quinoline.

3. A method for lowering blood pressure in the treatment of a hypertensive subject, which comprises administering to said subject an effective blood pressure lowering amount of a compound as claimed in claim **1**.

4,686,229

1,4-DIHYDROPYRIDINES

Ulrich Rosentreter; Elisabeth Perzborn, and Friedel Seuter, all of Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

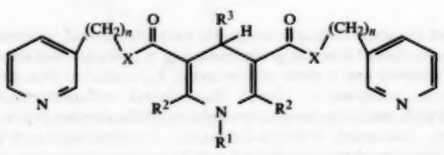
Filed Aug. 14, 1985, Ser. No. 765,908

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1984, 3431862

Int. Cl.[4] C07D *401/14;* **A61K** *31/44*

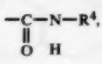
U.S. Cl. 514—332 **10 Claims**

1. A 1,4-dihydropyridine of the formula



in which
R^1 is hydrogen, alkyl having 1 to 5 carbon atoms or alkyl having 1 to 5C atoms and optionally substituted by carboxyl or alkoxycarbonyl having 1 to 4C atoms,
R^2 is hydrogen, or alkyl having 1 to 5C atoms,
R^3 is hydrogen, alkyl having 1 to 6C atoms, carboxyl, alk-

oxycarbonyl having 1 to 4C atoms, aryl having 6 to 19C atoms or aryl having 6 to 10C atoms and substituted by hydroxyalkyl, acetoxyalkyl or benzoyloxyalkyl, each having up to 2C atoms in each alkyl group, or by carboxyl, sulphoxyonyl or



and

R^4 is alkyl having 1 to 4C atoms, phenyl, benzyl, pyridyl, pyridylmethyl, furfuryl

X is oxygen, sulphur or NH, and

n is 1 to 6,

or a physiologically acceptable salt thereof.

4,686,230

PICOLINE DERIVATIVE USEFUL AS GASTRIC ACID SECRETION INHIBITORS

Georg Rainer, Constance; Volker Figala, Allensbach, and Bernhard Kohl, Constance, all of Fed. Rep. of Germany, assignors to Byk Gulden Lomberg Chemische Fabrik GmbH, Constance, Fed. Rep. of Germany

Filed Oct. 29, 1985, Ser. No. 794,230

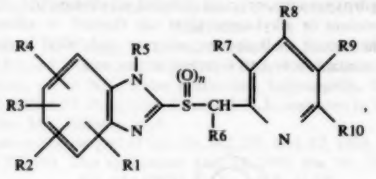
Claims priority, application Switzerland, Oct. 31, 1984, 5235/84

The portion of the term of this patent subsequent to Nov. 26, 2002, has been disclaimed.

Int. Cl.[4] C07D *403/12;* **A61K** *31/44*

U.S. Cl. 514—338 **23 Claims**

1. A compound of formula I



(I)

wherein each of R1, R2, R3 and R4 is in any position in the benzo part of the benzimidazole and wherein

R1 denotes hydrogen or C_1–C_6-alkyl,

R2 denotes hydrogen, halogen, C_1–C_6-alkyl, C_1–C_6-alkoxy, C_1–C_4-alkoxy-C_1–C_4-alkyl, C_1–C_4-alkoxy-C_1–C_4-alkoxy, phenyl, phenoxy, phenoxy-C_1–C_4-alkyl, phenoxy-C_1–C_4-alkoxy, phen-C_1–C_4-alkyl or phen-C_1–C_4-alkoxy,

R3 denotes hydrogen, C_1–C_6-alkyl, C_1–C_6-alkoxy, C_1–C_4-alkoxy wholly or predominantly substituted by fluorine, chlorodifluoromethoxy or 2-chloro-1,1,2-trifluoroethoxy or, together with R4, denotes C_1–C_2-alkylenedioxy wholly or partially substituted by fluorine, or chlorotrifluoroethylenedioxy,

R4 denotes C_1–C_4-alkoxy wholly or predominantly substituted by fluorine, chlorodifluoromethoxy or 2-chloro-1,1,2-trifluoroethoxy or, together with R3, denotes C_1–C_2-alkylenedioxy wholly or partially substituted by fluorine, or chlorotrifluoroethylenedioxy,

R5 denotes hydrogen or a group which can readily be eliminated under physiological conditions,

R6 denotes hydrogen or C_1–C_4-alkyl,

R7 denotes hydrogen, C_1–C_6-alkyl or C_1–C_6-alkoxy,

R8 denotes hydrogen, C_1–C_6-alkyl, C_1–C_6-alkoxy, C_1–C_4-alkoxy-C_1–C_4-alkoxy, C_2–C_5-alkenyloxy or C_2–C_5-alkynyloxy,

R9 denotes hydrogen or C_1–C_6-alkyl or C_1–C_6-alkoxy,

R10 denotes hydrogen or C_1–C_6-alkyl, and

n represents the numbers 0 or 1,

or a salt thereof, with the proviso that:

(a) R1 denotes hydrogen at the 4- or 7-position of the benzimidazole ring,

(b) R2, when at the 5- or 6-position of the benzimidazole ring, is C_1–C_4-alkoxy-C_1–C_4-alkyl, C_1–C_6-alkoxy-C_1–C_4-alkoxy, phenyl, phenoxy, phenoxy-C_1–C_4-alkyl, phenoxy-C_1–C_4-alkoxy, phen-C_1–C_4-alkyl or phen-C_1–C_4-alkoxy, and

(c) R3, when at the 5- or 6-position of the benzimidazole ring, is 2-chloro-1,1,2-trifluoroethoxy,

when

(d) R4 is at the 5- or 6-position and denotes chlorodifluoromethoxy or C_1–C_4-alkoxy wholly or predominantly substituted by fluorine, and

(e) R5 denotes hydrogen, and

(f) R6 denotes hydrogen, and

(g) R7 denotes hydrogen or C_1–C_6-alkyl or C_1–C_6-alkoxy, and

(h) R8 denotes hydrogen or C_1–C_6-alkyl or C_1–C_6-alkoxy, and

(i) R9 denotes hydrogen or C_1–C_6-alkyl or C_1–C_6-alkoxy, and

(j) R10 denotes hydrogen, and

(k) hydrogen atoms are present at the 4- and 7-positions of the benzimidazole ring, and

with the further proviso that:

(l) R3 and R4 (when in the 5- and 6-positions) do not together denote C_1–C_2-alkylenedioxy wholly or partially substituted by fluorine, or chlorotrifluoroethylenedioxy,

when

(m) R5 denotes hydrogen, and

(n) R6 denotes hydrogen, and

(o) R7 denotes hydrogen or C_1–C_6-alkyl or C_1–C_6-alkoxy, and

(p) R8 denotes hydrogen or C_1–C_6-alkyl or C_1–C_6-alkoxy, and

(g) R9 denotes hydrogen or C_1–C_6-alkyl or C_1–C_6-alkoxy, and

(r) R10 denotes hydrogen, and

(s) hydrogen atoms are present at the 4- and 7-positions of the benzimidazole ring.

4,686,231

INHIBITION OF 5-LIPOXYGENASE PRODUCTS

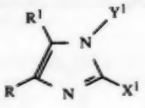
Paul E. Bender, Cherry Hill, N.J.; Don E. Griswold, North Wales; Nabil Hanna, Berwyn, and Henry M. Sarau, Hatfield, all of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 808,395, Dec. 12, 1985. This application Apr. 28, 1986, Ser. No. 856,927

Int. Cl.[4] C07D *403/30, 233/66, 401/00, 405/00*

U.S. Cl. 514—333 **37 Claims**

1. A compound of the formula



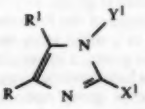
wherein:

X^1 is NHCN or NH_2;

R^1 and R are independently selected from 4-pyridyl or monosubstituted phenyl wherein said substituent is selected from halo or C_{1-4} alkoxy; and

Y^1 is H or CN provided that when X^1 is NH_2, Y^1 is CN when X^1 is NHCN, Y^1 is H; or a pharmaceutically acceptable salt thereof.

11. A method for treating rheumatoid arthritis in an animal in need thereof which comprises administering to such animal an effective, non-toxic 5-lipoxygenase pathway inhibiting amount of a compound of the formula



wherein:

X^1 is NHCN or NH_2;

R^1 and R are independently selected from 4-pyridyl or monosubstituted phenyl wherein said substituent is selected from halo or C_{1-4} alkoxy; and

Y^1 is H or CN provided that when X^1 is NH_2, Y^1 is CN and when X^1 is NHCN, Y^1 is H; or a pharmaceutically acceptable salt thereof.

4,686,232

FUNGICIDAL ANILINE DERIVATIVES

Junya Takahashi, Hyogo; Mitsuru Sasaki; Hiroshi Noguchi, both of Osaka, and Toshiro Kato, Hyogo, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

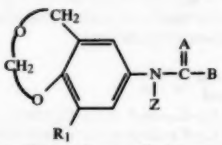
Filed Feb. 6, 1984, Ser. No. 577,352

Claims priority, application United Kingdom, Feb. 28, 1983, 8305485; Jun. 3, 1983, 8315314

Int. Cl.[4] A01N *37/18, 43/02;* **C07D** *319/08*

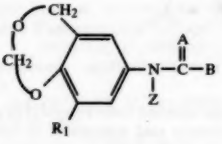
U.S. Cl. 514—365 **24 Claims**

1. A compound of the formula:



wherein R_1 is a lower alkyl group, a lower alkoxy group, a lower alkoxymethyl group, a lower alkoxycarbonyl group, a hydrogen atom, a halogen atom, or a cyano group; Z is a hydrogen atom, a lower alkyl group, a lower alkenyl group, a lower alkynyl group, a lower alkoxycarbonyl(lower)alkyl group or a group of the formula: —S—R_3 in which R_3 is a lower alkyl group, a phenyl group or a lower alkoxycarbonyl group; A is an oxygen atom or a sulfur atom; and B is a lower alkyl group, a lower alkenyl group, a cyclo(lower)-alkyl group, a phenyl group or a group of the formula: —W—R_4 in which W is an oxygen atom or a sulfur atom and R_4 is a lower alkyl group, a lower alkenyl group, a lower alkynyl group, a halo(lower)alkenyl group, a halo(lower) alkynyl group, a cyclo(lower)alkyl group, a phenyl group optionally substituted with halogen or a lower alkyl group substituted with at least one member selected from the group consisting of halogen, cyano, phenyl, cyclo(lower)alkyl or lower alkoxy.

2. A fungicidal composition which comprises as an active ingredient a fungicidally effective amount of a compound of the formula:



wherein R_1 is a lower alkyl group, a lower alkoxy group, a lower alkoxymethyl group, a lower alkoxycarbonyl group, a hydrogen atom, a halogen atom, or a cyano group; Z is a hydrogen atom, a lower alkyl group, a lower alkenyl group, a lower alkynyl group, a lower alkoxycarbonyl(lower)alkyl group or a group of the formula: —S—R_3 in which R_3 is a lower alkyl group, a phenyl group or a lower alkoxycarbonyl group; A is an oxygen atom or a sulfur atom; and B is a lower alkyl group, a lower alkenyl group, a cyclo(lower)alkyl group, a phenyl group or a group of the formula: —W—R_4 in which W is an oxygen atom or a sulfur atom and R_4 is a lower alkyl group, a lower alkenyl group, a lower alkynyl group, a halo(lower)alkenyl group, a halo(lower)alkynyl group, a cyclo(lower)alkyl group, a phenyl group optionally substituted with halogen or a lower alkyl group substituted with at least one member selected from the group consisting of halogen, cyano, phenyl, cyclo(lower)alkyl or lower alkoxy, and an inert carrier or diluent.

4,686,233

PESTICIDAL WATER-SOLUBLE AMINOACID SULFENYLATED CARBAMATES

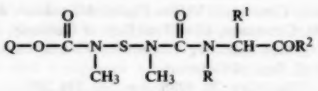
Chennupati K. Rao, Bhopal. M.P., India, and Themistocles D. D'Silva, Chapel Hill, N.C., assignors to Union Carbide Corporation, Danbury, Conn.

Division of Ser. No. 717,544, Mar. 29, 1985, Pat. No. 4,605,667. This application May 1, 1986, Ser. No. 858,017

Int. Cl.[4] A01N *47/24;* **C07D** *307/86*

U.S. Cl. 514—469 **15 Claims**

1. A compound of the formula:

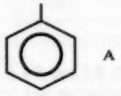


wherein

R is hydrogen or methyl; R^1 is hydrogen, alkyl, alkylthio, hydroxyalkyl, phenylalkyl, hydroxyphenylalkyl or indanylalkyl containing from 1 to 6 aliphatic carbon atoms; or R and R^1 can be joined together to form an alkylene chain which may carry a hydroxy substituent and which completes a 4–6 membered heterocyclic ring;

R^2 is hydroxy, amino, or an alkali metal, alkaline earth metal, ammonium or alkyl-ammonium salt thereof; or alkoxy, alkylamino or dialkylamino wherein each alkyl moiety may contain from 1 to 6 carbon atoms; and

Q is



wherein

A is a saturated or unsaturated divalent chain composed of carbon atoms and not more than two oxygen atoms which completes a 5 or 6 membered heterocyclic or carbocyclic ring wherein the carbon atoms of the chain may be substituted with one or more C_1–C_4 alkyl substituents.

4,686,234

MYCOPHENOLIC ACID DERIVATIVES IN THE TREATMENT OF INFLAMMATORY DISEASES, IN PARTICULAR RHEUMATOID ARTHRITIS

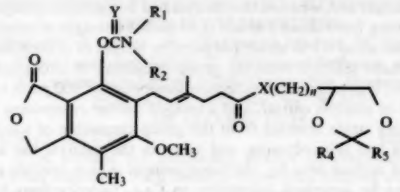
Peter H. Nelson, Los Altos; Anthony C. Allison, and Elsie M. Eugui, both of Belmont, all of Calif., assignors to Syntex (U.S.A) Inc., Palo Alto, Calif.

Filed Nov. 27, 1985, Ser. No. 803,041

Int. Cl.[4] C07D *307/88*

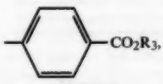
U.S. Cl. 514—469 **19 Claims**

1. A compound of the formula:



(I)

or a pharmaceutically acceptable salt thereof,
wherein:
R_1 is H or lower alkyl having 1 to 6 carbon atoms;
R_2 is H, lower alkyl having 1 to 6 carbon atoms or



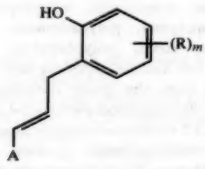
in which R_3 is H, lower alkyl having 1 to 6 carbon atoms or a pharmaceutically acceptable cation;
R_4 and R_5 are each independently H or lower alkyl having 1 to 6 carbon atoms;
X and Y are each independently O or S;
n is an integer of 1–6.

4,686,235
SUBSTITUTED CINNAMYL-2,3-DIHYDROBENZOFURAN AND ANALOGS USEFUL AS ANTI-INFLAMMATORY AGENTS

Michael N. Chang, Westfield; Norman P. Jensen, Princeton; Milton L. Hammond, Somerville; Robert A. Zambias, Springfield, all of N.J.; John McDonald, Indianapolis, Ind., and Kathleen M. Rupprecht, Cranford, N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation-in-part of Ser. No. 541,200, Oct. 12, 1983, Pat. No. 4,537,903. This application Aug. 12, 1985, Ser. No. 764,446
Int. Cl.[4] C07C *39/21;* **A61K** *31/05*
U.S. Cl. 514—520 **6 Claims**

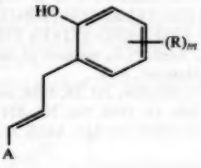
1. A compound of formula (II)



(II)

wherein
R is
(a) $COOR^2$ wherein R^2 is H or C_{1-6}alkyl;
(b) loweralkoxy;
(c) halologweralkylcarbonyl;
(d) halo;
(e) loweralkanoyl;
(f) lowerhaloalkyl;
(g) hydroxyloweralkyl; or
(h) cyano;
A is phenyl substituted with $(R^1)q$ wherein when there are more than one R^1 $(q>1)$ R^1 can be the same or different from each other and is
(1) hydrogen;
(2) halo;
(3) loweralkoxy;
(4) lower alkylthio;
(5) lower alkyl sulfinyl;
(6) lower alkyl sulfonyl;
(7) unsubstituted or substituted phenylloweralkyl;
(8) loweralkyl;
(9) loweralkenyl;
(10) lower alkanoyl;
(11) halologweralkyl;
(12) —COOH;
(13) aryl;
(14) aryloxy;
(15) cyano;
(16) hydroxyloweralkyl;
(17) halo loweralkanoyl; or
(18) loweralkanoyloxy;
q is 0 to 5; and
m is 1 to 3.

4. A pharmaceutical composition for treating topical inflammation comprising a pharmaceutical carrier and an effective amount of a compound of formula (II);



(II)

wherein
R is
(a) $COOR^2$ wherein R^2 is H or C_{1-6}alkyl;
(b) loweralkoxy;
(c) halologweralkylcarbonyl;
(d) halo;
(e) loweralkanoyl;
(f) lowerhaloalkyl;
(g) hydroxyloweralkyl; or
(h) cyano;
A is phenyl substituted with $(R^1)q$ wherein when there are more than one R^1 $(q>1)$ R^1 can be the same or different from each other and is
(1) hydrogen;
(2) halo;
(3) loweralkoxy;
(4) lower alkylthio;
(5) lower alkyl sulfinyl;
(6) lower alkyl sulfonyl;
(7) unsubstituted or substituted phenylloweralkyl;
(8) loweralkyl;
(9) loweralkenyl;
(10) lower alkanoyl;
(11) halologweralkyl;
(12) —COOH;
(13) aryl;
(14) aryloxy;
(15) cyano;
(16) hydroxyloweralkyl;
(17) halo loweralkanoyl; or
(18) loweralkanoyloxy;
q is 0 to 5; and
m is 1 to 3.

4,686,236

3-(3-IODOPROPARGYLOXY)-PROPIONITRILE, A PROCESS FOR ITS PREPARATION AND ITS USE

Gerold Schade, Cologne; Wilfried Paulus, and Hans-Georg Schmitt, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 3, 1986, Ser. No. 881,557

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1985, 3526789

Int. Cl.[4] A01N *37/34;* C01C *121/30*

U.S. Cl. 514—526 8 Claims

1. 3-(3-iodopropargyloxy)propionitrile of the formula

$$IC{\equiv}C{-}CH_2{-}O{-}CH_2{-}CH_2{-}CN.$$

2. A microbicidal agent comprising as an active agent a microbicidally effective amount of a 3-(3-iodopropargyloxy)-propionitrile of the formula

$$IC{\equiv}C{-}CH_2{-}O{-}CH_2{-}CH_2{-}CN$$

and an extender.

6. A method for the preservation of industrial materials comprising applying to said materials a microbicidally effective amount of a microbicidal agent, wherein said microbicidal agent being the agent of claim 2.

4,686,237

ERYTHRO-(E)-7-[3′-C_{1-3}ALKYL-1′-(3″,5″-DIMETHYLPHENYL)NAPHTH-2′-YL]-3,5-DIHYDROXYHEPT-6-ENOIC ACIDS AND DERIVATIVES THEREOF

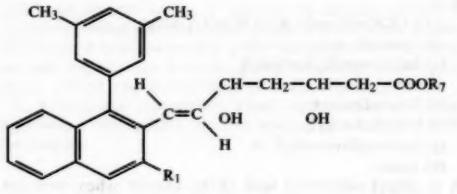
Paul L. Anderson, Randolph, N.J., assignor to Sandoz Pharmaceuticals Corp., E. Hanover, N.J.

Continuation of Ser. No. 633,809, Jul. 24, 1984, abandoned. This application Feb. 19, 1986, Ser. No. 831,394

Int. Cl.[4] C07D *309/30;* C07C *69/618;* A61K *31/365, 31/225*

U.S. Cl. 514—532 15 Claims

1. A compound of the formula



wherein

R_1 is C_{1-3}alkyl, and

R_7 is hydrogen, R_8 or M,

wherein

R_8 is a physiologically acceptable and hydrolyzable ester group, and

M is a cation.

4,686,238

PROCESS FOR THE PREPARATION OF HYDROCARBONS

Dirk Bode, and Swan T. Sie, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jan. 8, 1986, Ser. No. 817,221

Claims priority, application Netherlands, Jan. 18, 1985, 8500121

Int. Cl.[4] C07C *1/04*

U.S. Cl. 518—700 18 Claims

1. In a process for the preparation of hydrocarbons by the catalytic reaction of carbon monoxide with hydrogen comprising contacting a feed gas comprising a mixture of carbon monoxide and hydrogen at elevated temperature and pressure with a catalyst bed, in a vertical fixed bed reactor having an inlet of said catalyst bed, wherein the catalyst bed comprises a catalyst comprising from about 3 to about 60 parts by weight of cobalt and from about 0.1 to about 100 parts by weight of at least one other metal selected from the group consisting of zirconium, titanium, chromium and ruthenium supported on 100 parts by weight of catalyst carrier, and a catalyst carrier comprising a refractory oxide selected from the group consisting of silica, alumina and silica-alumina, and wherein the catalyst has an external surface area S_E, the improvement which consists of attaining an increased selectivity to C_3+ hydrocarbons by passing downwardly and concurrently with the feed gas through the vertical fixed bed reactor a liquid which boils above 100° C., and consists substantially of one or more hydrocarbons, at a superficial liquid flow velocity V_s at the inlet of the catalyst bed to satisfy the the relation $V_s \times S_E > 1$, where V_s is in cm/s and S_E is in cm^2/ml.

4,686,239

SOLID BIOCIDE DRY BLEND

Nuno M. Rei, Boxford, Mass., assignor to Morton Thiokol, Inc., Chicago, Ill.

Division of Ser. No. 853,083, Apr. 17, 1986, Pat. No. 4,663,359, which is a continuation-in-part of Ser. No. 707,628, Mar. 4, 1985, abandoned. This application Dec. 4, 1986, Ser. No. 937,810

Int. Cl.[4] C08J *9/00*

U.S. Cl. 521—55 4 Claims

1. A method of incorporating an effective amount of a microbiocide into a thermoplastic resin, said method comprising incorporating into said thermoplastic resin, in an amount which provides an effective concentration of the microbiocide in said thermoplastic resin, a microbiocide concentrate comprising a substantially non-dusting dry blend mixture of (a) a porous thermoplastic resin powder having a porosity of at least about 0.10 cc/g as measured by the mercury intrusion method or about 30% as measured on a void volume basis having a particle size between about 40 and about 300 mesh, and (b) a microbiocide, said microbiocide being present in the dry blend mixture at a concentration of at least about 20 times greater than the normal upper usage concentration of the microbiocide, and said microbiocide being within the pores of said thermoplastic resin powder, said porous thermoplastic resin powder being selected from the group consisting of polyvinyl chloride, polyethylene, polystyrene, polypropylene, nylon, styrene-butadiene copolymer, polycarbonate, polystyrene-polyphenylene oxide blend, polyphenylene oxide and ethylene/acrylic acid salt ionomer powders, and said microbiocide being selected from the group consisting of 10,10′-oxybisphenoxarsine; N-(trichloromethylthio)-4-cyclohexene-1,2-dicarboximide; 2,3,5-trichloro-4-propylsulfonyl pyridine; 2,3,4,5-tetrachloro-4-(methylsulfonyl) pyridine; zinc salt of 1-hydroxypyridine-2-thione; N-(trichloromethylthio) phthalimide; N-(2-methylnaphthyl) maleimide; cis-N-(1,1,2,2-tetrachlorethyl)-thio-4-cyclohexene-1,2-dicarboximide; 1-isopropyl-3-methyl pyrazolyl-5-dimethyl carbamate; 3-methyl pyrazolyl dimethylcarbamate; manganese ethylene bisdithiocarbamate; zinc ethylene bisdithiocarbamate; disodium ethylene bisdithiocarbamate; ferric dimethyl dithiocarbamate; zinc dimethyl dithiocarbamate; 2,4-dinitro-6-capryl phenol crotonate; p-chlorophenyl-p-chlorobenzene sulphonate; 2-N-octyl-4-isothiazolin-3-one; methyl-(butyl carbamoyl)-2-benzimidazole carbamate; 2-(4-thiazolyl) benzimidazole; copper 8-hydroxyl-quinolinate; α-diethoxyphosphinodithioacetylurea; α-dimethoxyphosphinodithioacetylurea; diethoxyphosphinodithioacetamide; dimethoxyphosphinodithioacetamide; bis(dimethylamido) phosphoryl flouride; 2-cyclohexyl-3-isothiazolone; 4,5-dichloro-2-cyclohexyl-3-isothiazolone and tributyl tin fluoride.

4,686,240

PROCESS FOR PRODUCING POLYURETHANE FOAMS USING FOAM MODIFIERS

Frederick E. Bailey, Jr., Charleston; Michael W. Jorgenson, Cross Lanes, and Robert D. Whitman, Charleston, all of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Oct. 25, 1985, Ser. No. 791,515
Int. Cl.[4] C08G 18/14
U.S. Cl. 521—103 124 Claims

1. A process for producing flexible polyurethane foams having improved foam stability comprising reacting and foaming in one step a reaction mixture comprising: (1) a polyol having a hydroxyl number from about 10 to about 100 and having greater than 50% primary hydroxy groups or greater than 50% secondary hydroxyl groups; (2) an organic polyisocyanate; (3) water; and (4) a foam modifier consisting of an alkali metal or alkaline earth metal ion and an anion of a Brönsted acid having a pKa of greater than 1, wherein said foam modifier is a foam modifier other than: (a) an inorganic alkaline earth metal salt that has a water solubility of less than one gram of salt per 100 milliliters of water at 25° C., (b) alkali metal dihydrogen phosphate or (c) alkali metal sulphate and wherein said composition has an Isocyanate Index from about 90 to about 130 with the proviso that, when there are greater than 50% secondary hydroxyl groups in the polyol, there are greater than 5.5 by weight parts water per 100 parts by weight of the polyol and with the further proviso that, when there are greater than 50% primary hydroxyl groups in the polyol, there are greater than 3.5 parts by weight water per 100 parts by weight of the polyol.

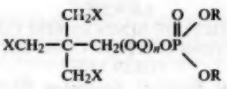
4,686,241

(HALONEOCARBYL-SUBSTITUTED)-BIS(ALIPHATIC HYDROCARBYL)PHOSPHORATES WITH POLYURETHANES

Chester E. Pawloski, Bay City; David J. Wampfler, and Donna J. Fielding, both of Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 28, 1986, Ser. No. 856,523
Int. Cl.[4] C08G 18/14
U.S. Cl. 521—107 25 Claims

1. A (haloneocarbyl-substituted)-bis(aliphatic hydrocarbyl) phosphorate represented by the formula



wherein

X is separately at each occurrence hydrogen, halo or C_{1-5} alkyl or C_{1-5} haloalkyl;

Q is separately at each occurrence C_{2-10} hydrocarbyl, C_{3-10} oxyhydrocarbyl C_{3-10} halohydrocarbyl or C_{3-10} oxyhalohydrocarbyl;

n is an integer from 1 to about 5;

R is separately at each occurrence C_{1-10} aliphatic hydrocarbyl; provided that

Q or X contains at least one halo moiety.

4,686,242

POLYUREA POLYMERS PREPARED FROM UREA CONTAINING PREPOLYMERS

Robert B. Turner; Richard D. Peffley; Raymond A. Plepys; Ralph D. Priester; Manuel Gonzales, Jr., and Kimbley A. Bushman, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 715,307, Mar. 25, 1985, abandoned. This application Jan. 31, 1986, Ser. No. 824,407
Int. Cl.[4] C08G 18/14, 18/32, 18/50
U.S. Cl. 521—137 22 Claims

1. A process for preparing a polyurea or polyurea-polyurethane polymer comprising reacting an amine functional compound having an equivalent weight of at least about 400 with an excess of a polyisocyanate to form an isocyanate-terminated prepoymer or quasi-prepolymer, and then reacting said isocyanate-terminated prepolymer or quasi-prepolymer with an isocyanate reactive material to form a polyurea and/or polyurea-polyurethane polymer.

4,686,243

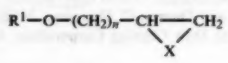
COPOLYMER, A PROCESS FOR ITS PREPARATION AND ITS USE AS ENZYME SUPPORTS

Karl-Heinz Keil, Hanau; Dieter Wullbrandt, Hofheim am Taunus; Reinhold Keller, Bad Soden am Taunus, and Friedrich Engelhardt, Frankfurt am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 16, 1986, Ser. No. 919,678
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1985, 3537259
Int. Cl.[4] C08J 9/00
U.S. Cl. 521—149 4 Claims

1. A crosslinked, porous, bead-like copolymer having

(a) repeating units of the monomeric compound of the formula I,



I

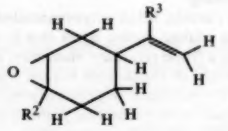
in which

R^1 denotes (C_2–C_4) alkenyl or the corresponding acid,

X denotes oxygen or NH, and

n denotes 1–6,

or repeating units of the compound of the formula II,



II

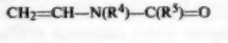
in which

R^2 and R^3, independently of one another, denote hydrogen or methyl,

or several such compounds,

(b) repeating units of one or more monomeric n-valent crosslinking agents,

(c) repeating units of the monomeric compound of the formula III



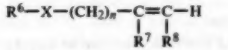
III

in which

R^4 and R^5, independently of one another, denote hydrogen or (C_1–C_8)-alkyl, or, together, represent —$(CH_2)_n$— where n=3, 4 or 5.

or several such compounds,

(d) repeating units of the monomeric comopunds of the formula IV,



IV

in which

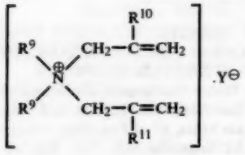
R^6 denotes the radical of a heterocyclic 5-membered ring compound which has at least one protonatable nitrogen atom in the ring, or pyridyl, quinolyl, isoquinolyl or pyrazinyl,

R^7 and R^8 denote hydrogen or (C_1–C_4)-alkyl,

X denotes oxygen or sulfur or a direct bond, and n denotes a number from 0 to 4,

or several such compounds,

(e) repeating units of the monomeric compound of the formula V



V

in which

R^9 denotes a (C_1–C_{10})-alkyl group,

R^{10} and R^{11}, independently of one another, denote hydrogen or methyl and

Y denotes halogen,

or several such compounds.

4,686,244

INTUMESCENT FOAMABLE COMPOSITIONS

John E. Dietlein, Bay City, and Thomas C. Hampton, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 17, 1986, Ser. No. 942,746
Int. Cl.[4] C09K *21/14;* C08J *9/22*
U.S. Cl. 523—179 14 Claims

1. A method for forming a flame and smoke barrier in a passage through a partition where said passage is traversed by at least one thermoplastic article, said method comprising sealing at least a portion of the length of said passage with an intumescent material comprising

100 parts by weight of a curable, filled polyorganosiloxane composition containing a latent curing agent that is convertible upon curing to a flame retardant elastomer; and

from 1 to 70 parts by weight of expandable hollow microspheres formed from a thermoplastic organic polymer and containing therein a liquid having a boiling point of from 50° to about 200° C. under atmospheric pressure.

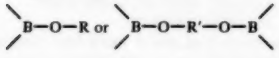
4,686,245

HIGH ENERGY IRRADIATED POLYCARBONATES CONTAINING ORGANIC BORATES

Linda H. Nelson, Evansville, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Jan. 2, 1985, Ser. No. 688,372
Int. Cl.[4] C08K *5/55;* C08J *3/28*
U.S. Cl. 522—163 42 Claims

14. A method for inhibiting yellowing of irradiation sterilized aromatic carbonate polymer which comprises irradiation sterilizing a composition comprising an aromatic carbonate polymer and an anti-yellowing upon exposure to sterilization radiation effective amount of a boron compound having as part of its structure at least one



group wherein R is selected from alkyl of one to twenty-four carbon atoms, inclusive; alkenyl of two to twenty-four carbon atoms, inclusive; cycloalkyl of four to fourteen carbon atoms, inclusive; aryl of six to fourteen carbon atoms, inclusive; and substituted phenyl wherein there are one to three substituents which are the same or different and are alkyl of one to six carbon atoms, inclusive, alkoxy of one to six carbon atoms, inclusive, and halo; and

R′ is selected from the same group as R with a further hydrogen atom replaced by a bond to the second oxygen.

4,686,246

SHOCK RESISTANT INK COMPOSITIONS AND WRITING INSTRUMENTS INCLUDING THE COMPOSITIONS

Chandrasen Gajria, Hingham, Mass., assignor to The Gillette Company, Boston, Mass.

Filed Dec. 23, 1985, Ser. No. 812,684
Int. Cl.[4] C09D *5/00*
U.S. Cl. 523—161 34 Claims

1. A shock-resistant, shear-thinning ink composition having a viscosity no greater than about 100 m Pa.s at shear rates produced by writing and consisting essentially of from about 50 to about 99 percent by weight of the composition of a polar solvent system including at least about 50 percent by weight water, an effective amount of colorant material, an amount of a water dispersible polymeric shear-thinning material sufficient to provide an ink having a shear thinning index between about 0.01 to about 0.60 and an amount of a substantially water insoluble polymeric, shock resistant providing material effective to provide shock-resistance for the ink composition but ineffective to substantially affect the shear-thinning capability of the polymeric shear-thinning providing material.

4,686,247

ADHESIVE COMPOSITION

Ethuo Yosida, Kameoka, Japan, assignor to Ohara Paragium Chemical Co., Ltd., Kyoto, Japan

Filed Jul. 11, 1986, Ser. No. 884,338
Claims priority, application Japan, Jan. 21, 1986, 61-11515
Int. Cl.[4] C08K *9/06*
U.S. Cl. 523—213 5 Claims

1. An adhesive composition characterized in that the composition is prepared by subjecting finely divided hydrophobic silica surface-treated with hexamethyldisilazane to a heat treatment under a reduced pressure, subsequently treating the silica with an acid gas, and admixing the resulting silica with an α-cyanoacrylate.

4,686,248

PREPARATION OF BINDERS FOR COATINGS, THERMOSETTING COATING COMPOSITIONS AND THEIR USE

Jurrianus Bekooij; Petrus G. Kooijmans; Werner T. Raudenbusch, and Stephen A. Stachowiak, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 694,738, Jan. 25, 1985, Pat. No. 4,614,775.
This application May 29, 1986, Ser. No. 868,868
Int. Cl.[4] C08L *63/04;* C08K *3/20*
U.S. Cl. 523—404 13 Claims

1. An aqueous thermosetting coating composition comprising (A) a water-thinnable curable binder prepared by a process comprising the steps of:

reacting together at a temperature from about 60 to about 170° C. and in the presence of an esterification catalyst which promotes the selective reaction of epoxy groups with carboxyl groups (a) a poly glycidyl ether having, on average, n epoxy groups per molecule, where $1 \leqq n < 2$, which comprises the reaction product of a multifunctional polyglycidyl ether having, on average, x epoxy groups per molecule, where $x > 2$, with (x-n) mol of a monofunctional phenol per mol of the multi functional polyglycidyl ether and (b) a dicarboxylic acid in an amount and under conditions effective for reacting essentially all the n epoxy groups per molecule with the dicarboxylic acid and producing a reaction product of (a) and (b) having an acid value in the range of about 20 to about 80 mg KOH/g and (B) a crosslinking compound present in an amount such that the solids weight ratio A:B is from about 95:5 to 60:40.

4,686,249

HEAT-HARDENABLE BINDER MIXTURE OF AMINO RESIN AND HYDROXY EPOXIDES

Horst Diefenbach, Nottuln, and Michael Geist, Münster, both of Fed. Rep. of Germany, assignors to BASF Farben + Fasern AG, Fed. Rep. of Germany

Continuation of Ser. No. 630,295, Jul. 12, 1984, abandoned, which is a division of Ser. No. 425,078, Sep. 23, 1982, Pat. No. 4,477,530. This application Aug. 27, 1985, Ser. No. 769,697

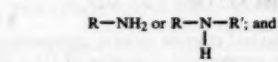
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1981, 3103642

Int. Cl.[4] C08L *63/00, 79/00*

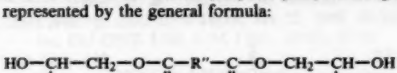
U.S. Cl. 523—410 19 Claims

1. A heat-hardenable binder mixture comprising:

(A) an organic resin having amino groups represented by the general formula:



(B) a cross-linking agent based on an organic compound which contains at least 2 β-hydroxyalkyl ester groups represented by the general formula:



wherein R = an organic resin selected from the group consisting of polyglycidyl ethers, polyglycidyl esters, polyglycidyl amines, copolymers of glycidyl acrylate, copolymers of glycidyl methacrylate and partialy epoxidized polybutadiene oils;

R′ = an alkyl group; and

R″ = polyester resin groups;

wherein the β-hydroxyalkyl ester groups of component (B) react with the amino groups of component (A) to form an amide bond and the basic nitrogen of the amino group of the resin of component (A) is adapted to convert in a stoved film into amide nitrogen of neutral pH.

4,686,250

MOISTURE RESISTANT, WET WINDING EPOXY RESIN SYSTEM CONTAINING AROMATIC DIAMINES

Shahid P. Qureshi, Piscataway, N.J., assignor to Amoco Corporation, Chicago, Ill.

Filed Dec. 27, 1985, Ser. No. 813,840

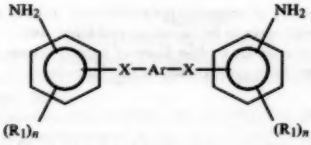
Int. Cl.[4] C08L *63/00;* C08G *59/50*

U.S. Cl. 523—440 22 Claims

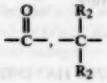
1. A curable, thermosetting resin composition consisting essentially of:

(a) at least one cycloaliphatic epoxy resin containing at least two 1,2-epoxy groups per molecule:

(b) at least one aromatic diamine hardener in an amount sufficient to provide from about 0.4 to about 2.0 equivalents of amine N—H per equivalent of 1,2-epoxy group in the epoxy resin, said diamine hardener having the following formula:



wherein Ar represents a single or fused aromatic nucleus of up to 10 carbon atoms, which optionally may contain one or more R and R_1 substituents; X represents O, S,



or a single bond; R and R_1 individually represent alkyl of from 1–12 carbon atoms or halogen groups; R_2 represents hydrogen or an alkyl group of from 1–12 carbon atoms; and n has a value of from 0 to 4; and wherein (a) and (b) have a viscosity as measured at 25° C. of no greater than 2000 cps; and

(c) a structural fiber.

4,686,251

METHOD FOR MAKING DECORATIVE RESIN-WOOD COMPOSITES AND THE RESULTANT PRODUCT

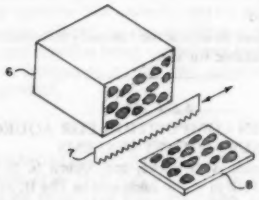
Michel E. Ostermann, Chateauneuf sur Isere, and Etienne M. Meriaux, Bourg les Valence, both of France, assignors to Societe Anonyme: Boxy Industries, France

Filed Jul. 26, 1985, Ser. No. 759,370

Claims priority, application France, Jul. 27, 1984, 84 12174

Int. Cl.[4] B27N *3/02;* B27M *3/04;* C08L *63/00*

U.S. Cl. 523—448 9 Claims



1. An improved process for making decorative resin-wood composites; said process being of the type wherein pieces or fragments of wood are submerged in an exothermically polymerizable resin within a mold to form a resin-wood composite; and the resin is exothermically cured whereby the heat of exothermia during polymerization causes substantial heating of the composite; wherein the improvement comprises the steps of: using a liquid epoxy resin and maintaining the temperature of the composite during exothermic polymerization at about ambient temperature; said resin being polymerized in the presence of a polymerization reagent having the least reactive character at the same ambient temperature.

8. A product constituted by a mass of polymerized epoxy resin and fragments of included wood obtained by the process of claim 1, wherein the product is substantially free of bubbles in the resin.

4,686,252

PROCESS FOR PREPARING A BUILDING AND/OR CONSTRUCTION MATERIAL, A POLYMER MODIFIED AQUEOUS DISPERSION, AND USE THEREOF FOR THE PREPARATION OF A BUILDING AND/OR CONSTRUCTION MATERIAL

Theodor A. Bürge, Geroldswil, and Reinhard Schweizer, Winterthur, both of Switzerland, assignors to Sika AG, vorm. Kaspar Winkler & Co., Zurich, Switzerland

Filed Jan. 16, 1986, Ser. No. 819,271

Claims priority, application Switzerland, Nov. 22, 1985, 4997/85

Int. Cl.[4] C08K *3/00*

U.S. Cl. 524—3 23 Claims

1. A process for preparing a building and/or construction material comprising admixing a stable aqueous dispersion, containing a noncuring mixture of amorphous silicon dioxide

and at least one polymer, with at least one inorganic binder, thereby reacting and hardening the admixture.

4,686,253

LIGHTWEIGHT JOINT COMPOUND HAVING IMPROVED PAINTABILITY

Arthur W. Struss, Libertyville; Terrance L. Williams, Crystal Lake, and Lawrence T. Eby, Arlington Heights, all of Ill., assignors to United States Gypsum Company, Chicago, Ill.

Filed Feb. 20, 1986, Ser. No. 831,973

Int. Cl.[4] C04B *11/16*

U.S. Cl. 524—44 **21 Claims**

1. A lightweight joint compound having properties suitable for use in finishing joints between the edges of adjacent wallboards, and having improved paintability properties, said joint compound comprising:

(1) a filler selected from the group consisting of calcium carbonate and calcium sulfate,

(2) a non-leveling agent,

(3) expanded perlite which has been treated with a composition to render said perlite water-impervious, said perlite having a mean particle size no greater than about 70 microns and being present in an amount of from about 3.5% to about 25% based on the dry weight of said joint compound,

(4) a thickener,

(5) a binder, and

(6) sufficient water to adjust the viscosity to render said joint compound suitable for use.

4,686,254

SUSPENSION COMPOSITION FOR AQUEOUS SURFACTANT SYSTEMS

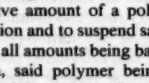
Robert Y. Lochhead, Avon Lake, and Debra S. S. Warfield, Fairview Park, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 5, 1985, Ser. No. 762,175

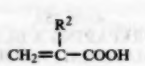
Int. Cl.[4] C08K *5/34*

U.S. Cl. 524—99 **6 Claims**

1. Composition containing suspended ingredients therein which are normally incompatible, said composition comprising 5 to 30 weight percent surfactant, 0.1 to 5 weight percent one or more anti-dandruff ingredient(s), 45 to 80 weight percent water, and an effective amount of a polymer to sufficiently thicken said composition and to suspend said ingredient so that it remains suspended, all amounts being based on the weight of the final formulation, said polymer being a polymerization product of 95 to 99 weight percent of one or more carboxylic acid(s), and 5 to 1 weight percent of one or more acrylic esters(s), crosslinked with a small amount of a crosslinking agent selected from polyalkenyl polyetheres having more than one alkenyl ether group per molecule, said carboxylic acid is selected from olefinically unsaturated acids defined as follows:



where R_2 is selected from hydrogen, halogens, cyanogen group —C≡N, alkyl radicals of 1 to 4 carbon atoms, aryl radicals of 6 to 14 carbon atoms, aralkyl radicals of 7 to 14 carbon atoms, alkaryl radicals 7 to 12, and cycloaliphatic radicals of 4 to 8 carbon atoms; said acrylic ester is defined as follows:



where R^2 is defined above in connection with said carboxylic acid and wherein R^3 is selected from alkyl groups of 10 to 30 carbon atoms.

4,686,255

STABILIZED POLYVINYL CHLORIDE MOLDING COMPOSITIONS

Werner Erwied, Langenfeld; Horst Upadek, Erkrath, and Bernd Wegemund, Haan, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

PCT No. PCT/EP84/00262, § 371 Date May 3, 1985, § 102(e) Date May 3, 1985, PCT Pub. No. WO85/01053, PCT Pub. Date Mar. 14, 1985

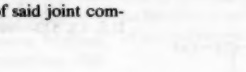
PCT Filed Aug. 30, 1984, Ser. No. 732,101

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1983, 3332003

Int. Cl.[4] C08K *5/37, 5/34*

U.S. Cl. 524—104 **8 Claims**

1. Stabilized polyvinyl chloride molding compositions containing a stabilizer combination consisting of (1) a primary stabilizer selected from the group consisting of metal soaps, aromatic metal carboxylates, metal phenolates, and organotin compounds, (2) a co-stabilizer having the structural formula:



wherein R represents an alkyl group with 1 to 19 carbon atoms, a cycloalkyl group with 5 or 6 carbon atoms, a phenyl group, an alkylphenyl group with 7 to 11 carbon atoms, or an MOOC—CH_2 group; n represents the numbers 0 or 1; and M represents lithium, sodium or potassium; said co-stabilizer being present in an amount of from about 0.02 to about 5 parts by weight, based on 100 parts by weight of said polyvinyl choride, and (3) from about 0.2 to about 5 parts by weight, based on 100 parts by weight of said polyvinyl chloride, of a synthetic, crystalline, finely-divided sodium aluminosilicate containing 13 to 25% by weight of bound water which, based on the anhydrous form, has the composition 0.7–1.1Na_2.Al_2O_3.1.3–2.-4SiO_2.

4,686,256

THERMOPLASTICALLY MOLDABLE COMPOSITIONS

Omar M. Boutni, Mt. Vernon, Ind., assignor to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 17, 1985, Ser. No. 809,274

Int. Cl.[4] C08K *5/10*; C08L *67/02, 73/00*

U.S. Cl. 524—318 **5 Claims**

1. A thermoplastically injection moldable, synthetic resin composition, which comprises;

a polyester resin which is the condensation product of a diol selected from the group consisting of the cis- and the trans-isomer of 1,4-cyclohexanedimethanol with a hexacarbocyclic dicarboxylic acid selected from the group consisting of isophthalic acid, terephthalic acid, and mixtures thereof;

sufficient quantity of aromatic polycarbonate resin to allow said polyester resin to be injection moldable; and

an effective amount for mold-release of a mold-release additive selected from compounds of the formula:

R-Y

wherein R is selected from alkyl having 17 to 40 carbon atoms, inclusive; and Y is selected from monovalent moieties of the formula: —COOR′ wherein R′ is selected from hydrogen and alkyl of 1 to 18 carbon atoms, inclusive.

5. The composition of claim 3 wherein the additive is the ester of a fatty acid and an alcohol of the formula

R-OH

wherein R is as defined in claim 1.

4,686,257

POLYPROPYLENE RESIN COMPOSITION CONTAINING FILLER

Tatsuyuki Mitsuno, Chiba; Teruhisa Koyama, Ehime; Hideo Shinonaga, and Akio Daimon, both of Chiba, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jul. 25, 1986, Ser. No. 889,533
Claims priority, application Japan, Jul. 25, 1985, 60-165584
Int. Cl.[4] C08K *3/00, 3/34;* C08L *35/00, 37/00*
U.S. Cl. 524—449 8 Claims

1. A filler-containing polypropylene resin composition comprising (a) from 30 to 90% by weight of a polypropylene resin, (b) from 2.5 to 38% by weight of an ethylene copolymer composed of from 82 to 98.7 mol% of ethylene, from 1 to 15 mol% of an ester selected from alkyl acrylates and alkyl methacrylates having from 1 to 8 carbon atoms in the alkyl moiety thereof and from 0.3 to 3 mol% of an unsaturated dicarboxylic acid anhydride, and (c) from 5 to 50% by weight of a filler.

4,686,258

Patent Not Issued For This Number

4,686,259

Patent Not Issued For This Number

4,686,260

PRINTING INK COMPOSITION

Martin K. Lindemann, Greenville, and Kim Deacon, Rockhill, both of S.C., assignors to Sun Chemical Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 911,081, Sep. 24, 1986, which is a continuation-in-part of Ser. No. 753,685, Jul. 10, 1985, Pat. No. 4,616,057. This application Nov. 25, 1986, Ser. No. 934,796
Int. Cl.[4] C08K *3/20*
U.S. Cl. 524—458 11 Claims

1. A printing ink composition comprising: a pigment and an aqueous polymer emulsion containing a first polymer network containing an active crosslinking agent which is intertwined on a molecular scale with a second polymer network wherein the second polymer differs from the first polymer and the first polymer comprises 5 to 95% on a solids by weight basis of the emulsion.

4,686,261

PROCESS FOR PRODUCING POWDERY PAINT ADDITIVE COMPRISING REACTING A DIMER ACID POLYAMIDE, A HYDROXYL-SUBSTITUTED FLUORORESIN AND A POLYISOCYANATE

Minoru Naito, 77 Shimo-odanaka, Nakahara-ku, Kawasaki-shi, Japan

Filed May 14, 1986, Ser. No. 863,255
Claims priority, application Japan, May 14, 1985, 60-102394
Int. Cl.[4] C08L *175/00*
U.S. Cl. 525—131 3 Claims

1. A process for producing a powdery paint additive comprising reacting (a) a polymerized fatty acid polyamide resin formed by the reaction of a polymerized fatty acid with a polyamine and soluble in an organic solvent, (b) a fluorine-containing copolymer having an active hydroxyl group in its molecular structure, an average molecular weight of 20,000 to 80,000, a fluorine content of 20 to 70 wt. %, and soluble in an organic solvent, and (c) a polyisocyanate which functions as a hardening agent for said resins (a) and (b) and which is soluble in an organic solvent, to thereby form a hardened reaction product, said reaction being carried out in an organic solvent inert to an isocyanate group, and pulverizing the resulting reaction product.

4,686,262

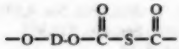
THERMOPLASTIC BLOCK COPOLYESTERS, A PROCESS FOR THE PREPARATION THEREOF AND THEIR USE FOR THE PRODUCTION OF MOULDINGS

Rudolf Binsack; Karl-Heinz Köhler, both of Krefeld, Fed. Rep. of Germany; Ulrich Grigo, New Martinsville, W. Va.; Leo Morbitzer, Cologne, Fed. Rep. of Germany; Ludwig Bottenbruch, Krefeld, Fed. Rep. of Germany, and Walter Heitz, Kirchhain, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 14, 1981, Ser. No. 330,766
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1980, 3047927
Int. Cl.[4] C08G *81/02*
U.S. Cl. 525—177 9 Claims

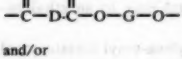
1. Block copolyesters having a relative viscosity (measured in phenol/o-dichlorobenzene, weight ratio of 1:1, at 25° C.) of from 1.15 to 3.0, which consist of the following, the terminal groups not being considered:

(A) from 1 to 60% by weight, based on the block copolyester, of long-chain units of the following formula:



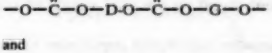
Ia

and/or



Ib

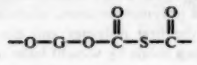
and/or



Ic

and

(B) from 40 to 99% by weight, based on the block copolyester, of short-chain units of the following formula:



II

characterised in that

D represents a divalent polydiene radical containing at least 50 mol % of 1,4-bonds, terminal-positioned bonding points and having an average molecular weight $\bar{M}_n$ of from 400 to 5000 and side chains which may optionally be present must be methyl and/or vinyl groups;

G represents a divalent aliphatic radical having from 1 to 12 carbon atoms, and/or a divalent cycloaliphatic radical having from 6 to 12 carbon atoms with a molecular weight of less than 300, at least 70 mol % of G representing a uniform radical;

S represents a direct bond or a divalent aliphatic, cycloaliphatic and/or aromatic radical having from 1 to 14 carbon atoms and having a molecular weight of less than 300, at least 70 mol % of S being 1,4-phenylene radicals.

4,686,263

MODIFIED EPDM RUBBERS, THE PRODUCTION THEREOF AND THE USE THEREOF FOR THE PRODUCTION OF IMPACT-RESISTANT VINYL POLYMERS

Manfred Beck, Wipperfuerth, and Wolfgang Nentwig, Cologne, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 22, 1985, Ser. No. 757,724

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1984, 3428496

Int. Cl.[4] C08L *9/06, 51/04, 53/02*

U.S. Cl. 525—245 **2 Claims**

1. Modified EPDM rubbers containing copolymerized units (a) through (d) wherein (a) through (d) are as follows:

(a) from 20 to 90% by weight of ethylene units,

(b) from 1 to 25% by weight of units of a butadiene/styrene block copolymer containing a quantity of styrene of from 10 to 90% by weight,

(c) from 0 to 10% by weight of units of an unconjugated diolefin and

(d) a sufficient amount of C_3–C_{18} α-monoolefin units to make the sum of (a), (b), (c) and (d) 100% by weight.

4,686,264

PARTIALLY HYDROLYZED ETHYLENE-VINYL ACETATE (EVA) ELASTOMERS VULCANIZABLE WITH SULFUR

John M. Hoyt, Cincinnati, and Steven D. Blazey, Akron, both of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Division of Ser. No. 668,606, Nov. 7, 1984, Pat. No. 4,575,531. This application Jan. 3, 1986, Ser. No. 815,962

Int. Cl.[4] C08F *8/34*

U.S. Cl. 525—330.4 **14 Claims**

1. A process for producing a sulfur vuncanizable ethylene-vinyl acetate copolymer which comprises the steps of:

adding a molecular weight stabilizer to an ethylene-vinyl acetate copolymer;

partially hydrolyzing said ethylene-vinyl acetate copolymer to produce vinyl alcohol groups, said vinyl alcohol groups present in a concentration of between about 0.5 to about 50 weight percent, based on the total weight of said copolymer;

subjecting said partially hydrolyzed copolymer to thermal modification to produce ethylenically unsaturated positions in the copolymer; and

reacting said vinyl alcohol groups with a halo organic acid.

4,686,265

PROCESS FOR POLYMERIZATION OF OLEFINS

Kouji Maruyama; Takeshi Nomura; Hiroshi Ueno, and Naomi Inaba, all of Saitama, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 768,924, Aug. 23, 1985, Pat. No. 4,613,581, which is a continuation of Ser. No. 564,789, Dec. 22, 1983, abandoned. This application May 29, 1986, Ser. No. 868,000

Claims priority, application Japan, Dec. 28, 1982, 57-227488; Dec. 28, 1982, 57-227489

Int. Cl.[4] C08F *4/64*

U.S. Cl. 526—125 **13 Claims**

1. A process for the polymerization of olefins which process comprises contacting under polymerization conditions an alphaolefin with a catalyst system comprising

(a) an organoaluminum compound cocatalyst, and

(b) a solid titanium containing catalyst component obtained by copulverizing a magnesium dialkoxide with a halogenated hydrocarbon having two or more carbon atoms, an electron donor compound and a tetravalent titanium halide compound with the proviso that the magnesium dialkoxide is contacted with the halogenated hydrocarbon prior to or simultaneously with the titanium halide

2. The process in accordance with claim 1 wherein the magnesium dialkoxide is contacted with a magnesium halide prior to contact with the halogenated hydrocarbon, electron donor compound and titanium compound.

4,686,266

BIS(ALLYL CARBONATE) MONOMER AND METHOD FOR POLYMERIZING SAME

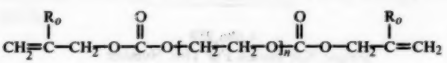
Robert H. Tang, Norton, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 674,115, Nov. 23, 1984, Pat. No. 4,613,656. This application May 1, 1986, Ser. No. 858,316

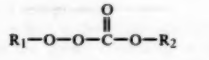
Int. Cl.[4] C08F *110/00*

U.S. Cl. 526—193 **8 Claims**

1. In the method of polymerizing polyol(allyl carbonate) monomer represented by the graphic formula,



wherein R_o is hydrogen, halogen or C_1–C_4 alkyl, and n is a whole number from 1 to 3, wherein the monomer is mixed with peroxide initiator and the resultant mixture exposed to a thermal zone to polymerize the monomer, the improvement which comprises utilizing as the monomer a prepolymer of the polyol(allyl carbonate) having between about 15 and 50 percent allylic utilization and utilizing, as the sole initiator, from about 0.75 to about 1.50 parts, per hundred parts of prepolymer, of a monoperoxycarbonate represented by the graphic formula:



wherein R_1 is a tertiary C_4–C_5 alkyl and R_2 is a C_3–C_7 alkyl, thereby to form a fully cured, intact solid article having a fifteen second Barcol hardness of at least 20.

4,686,267

FLUORINE CONTAINING POLYMERIC COMPOSITIONS USEFUL IN CONTACT LENSES

Edward J. Ellis, and Jeanne Y. Ellis, both of Lynnfield, Mass., assignors to Polymer Technology Corporation, Wilmington, Mass.

Filed Oct. 11, 1985, Ser. No. 786,846

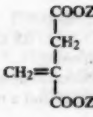
Int. Cl.[4] C08F *30/08*

U.S. Cl. 526—245 **29 Claims**

1. An oxygen permeable dimensionally stable, hydrophilic,

contact lens material of high transparency, comprising a polymer formed by free radical polymerization from

(A) 5 to 60% by weight of a fluorine containing itaconate mono or diester having the structure:



wherein:

Z_1 and Z_2 can be the same or different and are each of a group selected from among the following with at least one of Z_1 or Z_2 containing fluorine:

hydrogen,

straight chain alkyl groups or fluoro substituted alkyl groups containing from 1 to 18 carbon atoms,

branched chain alkyl groups or fluoro substituted alkyl groups containing from 4 to 18 carbon atoms,

cyclic alkyl groups or fluoro substituted cyclic alkyl groups containing from 5 to 18 carbon atoms,

phenyl groups and fluoro substituted phenyl groups, or benzyl and fluoro substituted benzyl groups, phenethyl and fluoro substituted phenethyl groups,

ethers and polyethers of the general structure

$$(C_xP_{2x}O)_e-(C_yP_{2y+1})$$

wherein:

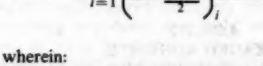
"P" is hydrogen or fluorine

"x" is an integer from 1 to 4

"y" is an integer from 1 to 10

"e" is an integer from 1 to 10,

(B) 95 to 40% by weight of at least one organic comonomer of an ethylenically unsaturated organosiloxane having the following formula:



wherein:

"X" is an ethylenically unsaturated group selected from the group consisting of vinyl, acryloxy, methacryloxy, vinyloxy, and carbovinyloxy,

"Y" represents no group or is selected from the group consisting of a divalent alkane radical having from 1 to 10 carbon atoms, a divalent alkene radical having 2 to 10 carbon atoms and a phenylene radical,

"a" is an integer from 1 to 10,

"n" is an integer from 2 to 30,

"b" is an integer from 0 to 3 and may be the same or different within each "i" moiety,

"R" is selected from the class consisting of hydrogen, hydroxy, alkoxy, carboalkoxy, alkyl and substituted alkyl groups containing from 1 to 20 carbon atoms, cyclic alkyl or substituted cyclic alkyl groups containing from 5 to 10 carbon atoms, phenyl and substituted phenyl groups, benzyl and substituted benzyl groups and phenethyl and substituted phenethyl groups "R" and "b" may be the same or different within each "i" moiety.

4,686,268

COPOLYMERS OF BENZOTRIAZOL MONOMERS WITH MALEIC OR FUMARIC ACID DERIVATIVES AND POLYMERIC MATERIAL COMPOSITIONS

Seoh Won Kang, Busan, Rep. of Korea, assignor to Morisawa & Co., Ltd., Tokyo, Japan

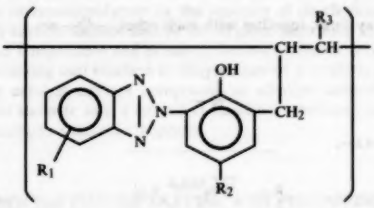
Filed Jun. 11, 1986, Ser. No. 873,524

Int. Cl.[4] **C08F** *26/06*

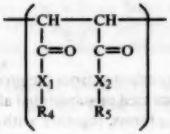
U.S. Cl. 526—259 **17 Claims**

1. Copolymers of average molecular weight within the range from about 1,000 to about 50,000, preferably from about 1,000 to about 10,000, are provided containing the repeating polymeric unit having the formula (I) and the repeating polymeric unit having the formula (II):

(I)



(II)



wherein:

R_1 is hydrogen, halogen, or alkyl;

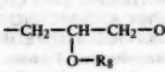
R_2 is alkyl or aralkyl;

R_3 is hydrogen or alkyl;

R_4 and R_5, which may be the same or different, each are hydrogen, alkyl, cycloalkyl, alkenyl, aralkyl, aryl, glycidyl, tetrahydrofurfuryl, an alkyl group substituted with halogen, cyano or carbonyl radical,

a group having the general formual $—CH_{2n}—X_3—R_6$,

a group of the formula

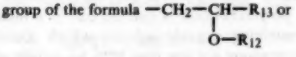


a group of the formula $—C_2H_4O_m—R_9$,

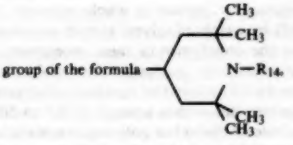
a group of the formula $—C_3H_6O_p—R_{10}$,

a group of the formula

a group of the formula



a group of the formula



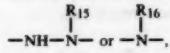
wherein:

each of R_6, R_7, R_8, R_9, R_{10}, R_{11} and R_{12} are selected from the group consisting of hydrogen, non-substituted or substituted alkyl, cycloalkyl, aryl, aralkyl and acyl, or R_6 forms, together with R_4 or R_5, a heterocyclic ring;

R_{13} is selected from the group consisting of hydrogen and non-substituted or substituted alkyl;

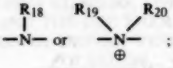
R_{14} is selected from the group consisting of hydrogen, oxyl, non-substituted or substituted alkyl and acyl;

X_1 and X_2, which may be the same or different, each are —O—,



or they form, together with each other, —O— or

X_3 is —O—,



each of R_{15} and R_{18} are selected from the group consisting of hydrogen, non-substituted or substituted alkyl, cycloalkyl, aryl and acyl, or R_{18} forms, together with R_6, a heterocyclic ring;

each of R_{16}, R_{17}, R_{19} and R_{20} are selected from the group consisting of hydrogen, non-substituted or substituted alkyl, cycloalkyl and aryl, or each of R_{16}, R_{19} and R_{20} form, together with R_4, R_5 or R_6, a heterocyclic ring;

n is a number from 1 to 20;

m is a number from 1 to 20; and

p is a number from 1 to 20.

4,686,269

PACKING MATERIAL FOR LIQUID CHROMATOGRAPHY AND METHOD FOR THE PREPARATION THEREOF

Kuniyuki Tokunaga, Tokuyama, and Tsutomu Hashimoto, Kawasaki, both of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin Nanyo, Japan

Filed Dec. 26, 1985, Ser. No. 813,425

Claims priority, application Japan, Dec. 27, 1984, 59-274013

Int. Cl.[4] C08F *12/36*

U.S. Cl. 526—336 **9 Claims**

1. A method for the preparation of the packing material for liquid chromatography comprising a copolymer of a monovinyl aromatic monomer and a divinyl or polyvinyl aromatic monomer, wherein, in gel permeation chromatography characterized in that, upon the copolymerization of monovinyl aromatic monomer with divinyl or polyvinyl aromatic monomer, suspension polymerization is carried out in a mixed aqueous solution containing organic solvent which dissolves whole monomer containing not less than 60% by weight of divinyl or polyvinyl aromatic monomer in whole monomer by amounts of 50 to 300% by weight of solvent to both monomers and does not dissolve the copolymer of these monomers and radical polymerization initiator, exclusion limit molecular weight is not less than 1×10^3 in terms of standard polystyrene, average particle diameter lies within a range of 0.5 to 50 m and the constitution rate of divinyl or polyvinyl aromatic monomer in copolymer particles is not less than 60% by weight.

4,686,270

PROCESS FOR PREPARING AND PROCESSING A RESIN COMPOSITION

Robert Van der Linde, and Johan Rietberg, both of Zwolle, Netherlands, assignors to DSM Resins B.V., Zwolle, Netherlands

Filed Aug. 5, 1985, Ser. No. 762,325

Claims priority, application Netherlands, Aug. 9, 1984, 8402455

Int. Cl.[4] C08G *59/00, 63/00, 63/48, 63/54*

U.S. Cl. 527—601 **18 Claims**

1. A cross-linkable resin composition comprising:

resin A which consists of the reaction product of an epoxidized fatty acid ester of a polyvalent alcohol and a monovalent carboxylic acid; and

resin B which consist of a carboxylic acid-modified fatty acid ester of a polyvalent alcohol.

4,686,271

HYDRAULIC SILICONE CRUMB

Earl W. Beck, Dublin, Calif., and Sam A. Brady, Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Mar. 3, 1986, Ser. No. 835,496

Int. Cl.[4] C08G *77/06*

U.S. Cl. 528—15 **40 Claims**

1. A silicone crumb comprising the cured product obtained by curing a mixture of

(A) a vinyl-containing polyorganosiloxane consisting essentially of units selected from the group consisting of diorganosiloxane units, monoorganosilsesquioxane units, and triorganosiloxy units in which the organic radicals are monovalent hydrocarbon radicals or monovalent halogenated hydrocarbon radicals, in the polyorganosiloxane the organic radicals being such that at least 0.1 weight percent of them are vinyl radicals,

(B) a silicon-bonded hydrogen containing polysiloxane in which there is at least 0.5 weight percent silicon-bonded hydrogen atoms, the valences of the silicon atoms not being satisfied by divalent oxygen atoms or silicon-bonded hydrogen atoms are satisfied by monovalent hydrocarbon radicals or monovalent halogenated hydrocarbon radicals,

(C) a platinum catalyst for the hydrosilation reaction of (A) and (B), the cured product being in a fine particulate form which exhibits an extrusion rate of at least 50 grams per minute through an orifice of 0.5 inch diameter under a pressure of 345 kilopascals and compression points of less than 1035 kilopascals for the first two compressions.

4,686,272

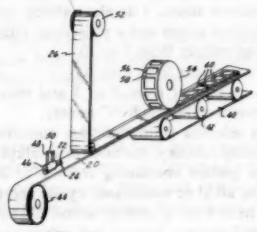
PACKAGED ADHESIVE

Richard B. Wallace, Bloomfield Hills, Mich., assignor to The Oakland Corporation, Troy, Mich.

Filed Jul. 10, 1985, Ser. No. 753,525

Int. Cl.[4] F16B *39/00*

U.S. Cl. 528—87 **14 Claims**



1. A fluid adhesive mixture of different fluids in which one of said fluids comprises an uncured, curable fluid resin and an-

other of said fluids comprises a fluid curing agent for said resin, said mixture being in the form of a multiplicity of small discrete, contiguous deposits of the different fluids in which adjacent deposits are separated by a thin flexible rupturable barrier film formed of the cured resin as reacted by the fluid curing agent.

4,686,273

PROCESS FOR PREPARING MODIFIED POLY(ALKYLENE CARBONATE) POLYAHLS

Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 18, 1985, Ser. No. 799,211
Int. Cl.[4] C08G 63/62
U.S. Cl. 528—196 **71 Claims**

1. A process for preparing a modified poly(alkylene carbonate)polyahl, which comprises:

reacting a poly(alkylene carbonate)polyahl with a modifier selected from the group consisting of polyesters, polyfunctional cyclic anhydrides, and polyahls to form a modified poly(alkylene carbonate)polyahl having an increased molecular weight, and removing at least one gaseous compound other than a monoalkylene glycol from said reaction, said gaseous compound being at least as volatile as a tetraethylene glycol and said modifier (1) having a plurality of moieties that are reactive with a residue selected from the group consisting of carbonate and active hydrogen moieties of the poly(alkylene carbonate)polyahl and (2) being about as volatile or less volatile than the major gaseous compound removed; the ratio of said modifier per equivalent of active moiety of the poly(alkylene carbonate)polyahl and said reaction conditions being sufficient to provide a modification of the poly(alkylene carbonate)polyahl.

4,686,274

PROCESS FOR PREPARING MODIFIED POLY(ALKYLENE CARBONATE) POLYAHLS

Robert F. Harris, Midland, Mich., and Donald G. Prier, Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 16, 1985, Ser. No. 809,675
Int. Cl.[4] C08G 63/62
U.S. Cl. 528—196 **37 Claims**

1. A process for modifying a poly(alkylene carbonate)-polyahl which comprises:

contacting the poly(alkylene carbonate)polyahl with at least one modifier including at least one active hydrogen moiety or a cyclic anhydride moiety selected from the group consisting of polyahls and cyclic anhydrides, containing two or more functional groups and reacting an active moiety of said poly(alkylene carbonate)polyahl and said reactive moiety of said modifier to form a modified poly-(alkylene carbonate)polyahl wherein the modifier is chemically bonded to the poly(alkylene carbonate)-polyahl; the reaction conditions and the proportion of the modifier to the polyahl being sufficient to provide a modified product weight of the poly(alkylene carbonate)-polyahl.

4,686,275

SATURATED LINEAR POLYESTER RESIN COMPOSITION SUITABLE FOR COATING A METAL FOR ANTI-CORROSION AND/OR DECORATIVE PURPOSES

Collin J. Bryant, Weston, and Tom Mitsopoulos, Toronto, both of Canada, assignors to Valvoline Oil & Chemicals Ltd., Mississauga, Canada

Filed Feb. 25, 1986, Ser. No. 832,610
Int. Cl.[4] C08G 63/48
U.S. Cl. 528—295.5 **16 Claims**

1. A saturated linear polyester resin composition suitable for coating a metal for anti-corrosion and/or decorative purposes, comprising:

a polyol, a dibasic acid and from about 4 to about 12% by weight solids of a C_{16} to C_{18} carbon chain oil function in the form of a fatty acid or derivative thereof.

4,686,276

PROCESS FOR PREPARING POLY (ALKYLENE CARBONATES)

Michael O. Myers, Baton Rouge, La., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 30, 1985, Ser. No. 814,851
Int. Cl.[4] C08G 63/62
U.S. Cl. 528—371 **15 Claims**

1. An improved process for the preparation of a poly(alkylene carbonate)polymer by the reaction of an alkylene oxide with carbon dioxide and/or an alkylene carbonate at an elevated temperature and pressure, the improvement comprising conducting said reaction in the presence of a catalytic amount of a catalyst mixture comprising an alkaline catalyst and a metal stannate salt, a tetraalkyl stannane compound and/or a tetraalkoxy stannate compound.

4,686,277

PROCESS FOR SEPARATING AND POLYMERIZING CYCLIC OLIGOMERIC POLYCARBONATE

Richard W. Howery, Mt. Vernon; Niles R. Rosenquist; Robert A. Pyles, both of Evansville, and Patrick J. Mulvey, Mt. Vernon, all of Ind., assignors to General Electric Company, Mt. Vernon, Ind.

Filed Dec. 23, 1985, Ser. No. 812,450
Int. Cl.[4] C08G 63/62
U.S. Cl. 528—493 **5 Claims**

1. A process for separating solid cyclic oligomeric dihydric phenol carbonate from solid high molecular weight linear aromatic polycarbonate which comprises admixing an organic solvent with a composition comprising major quantities of solid high molecular weight linear aromatic polycarbonate and minor quantities of solid cyclic oligomeric dihydric phenol carbonate to dissolve cyclic oligomeric carbonate but not aromatic polycarbonate; separating the cyclic oligomeric dihydric phenol carbonate soluble in the organic solvent from the high molecular weight linear aromatic polycarbonate insoluble in the organic solvent, said organic solvent selected so that a very large fraction of the said solid cyclic oligomer is separated from a very large fraction of the said polycarbonate which remains as a solid in the organic solvent and polymerizing the cyclic oligomeric dihydric phenol carbonate to linear high molecular weight polycarbonate.

4,686,278

RECOVERING CHLORINATED POLYMERS FROM SOLUTION

John C. Padget, Cheshire, England, and James T. Forrester, deceased, late of Cheshire, England (by Mary Forrester, executor), assignors to Imperial Chemical Industries plc, London, England

Continuation of Ser. No. 717,679, Mar. 29, 1985, abandoned. This application Dec. 19, 1985, Ser. No. 811,325
Claims priority, application United Kingdom, Apr. 2, 1984, 8408443
Int. Cl.[4] C08F 6/12
U.S. Cl. 528—495 **8 Claims**

1. A process for recovering a chlorinated polymer of low residual solvent content from solution in a chlorinated hydrocarbon solvent which comprises treating the solution with steam or hot water, thereby separating the chlorinated polymer in solid form, in the presence of both a chlorinated paraffin containing at least 8 carbon atoms in an amount of up to 10% by weight of the chlorinated polymer being recovered and an aliphatic alcohol containing at least 8 carbon atoms in an

amount of up to 5% by weight of the chlorinated polymer being recovered.

4,686,279

DEVICE AND PROCESS FOR RECOVERING POLYMER FROM A SOLUTION

Nicolaas P. Nagtzaam, Sittard; Cornelis Bronke, Geleen, and Albert J. H. Brasz, Munstergeleen, all of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Continuation of Ser. No. 696,499, Jan. 30, 1985, abandoned, which is a continuation of Ser. No. 523,767, Aug. 17, 1983, abandoned. This application Mar. 10, 1986, Ser. No. 838,432

Claims priority, application Netherlands, Aug. 21, 1982, 8203821

Int. Cl.[4] C08F *6/12*

U.S. Cl. 528—501 **8 Claims**

1. A process for recovering polymer from a solution containing volatile solvents, high molecular weight polymers having a melt index lower than 2 and unreacted monomers comprising the combination of:

preparing the polymer solution containing solvents in a reactor;

feeding the polymer solution from the reactor to at least one separate evaporating zone through a first valve means positioned upstream of the evaporating zone to control upstream pressure and evaporating sufficient solvent to produce a concentrated polymer solution having 80–99 percent weight polymer;

maintaining pressure in the evaporating zone while feeding the concentrated polymer solution from the evaporating zone to a second valve means positioned downstream from the evaporating zone;

feeding the concentrated polymer solution from the second valve means to the feed section of a devolatizing extruder under reduced pressure from the pressure in the evaporating zone and maintaining a pressure difference between the evaporating zone and the feed section of the extruder so that the pressure difference is used as the driving force to feed the concentrated polymer solution via the second valve means while simultaneously isolating the feed section from upstream evaporating zone pressures; and

adjusting the operating speed of the extruder so that the feeding of the concentrated polymer solution will incompletely fill the extruder at the feed section of the extruder.

4,686,280

POSITIVE TYPE RESIST MATERIAL WITH TRIMETHYLSILYLNITRILE

Ken Ogura, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Apr. 25, 1985, Ser. No. 727,395

Claims priority, application Japan, Apr. 26, 1984, 59-82836

Int. Cl.[4] G03C *1/60*

U.S. Cl. 430—190 **16 Claims**

1. A positive type resist material consisting essentially of a mixture of

a photoactive resin having phenolic hydroxyl groups selected from the group consisting of an admixture of a naphthoquinone diazide sulfonic acid derivative compound and a phenol formaldehyde, and an ester of the reaction of a naphthoquinone diazide sulfonic acid derivative compound and a phenol formaldehyde;

5 to 50% by weight of trimethylsilylnitrile based on the solid content of the positive resist material; and

an organic solvent.

10. A positive type resist solution consisting essentially of a mixture of

a base material solution forming a positive resist pattern, said base material solution being composed of a photoactive resin having phenolic hydroxyl groups selected from the group consisting of an admixture of a naphthoquinone diazide sulfonic acid derivative compound and a phenol formaldehyde, and an ester of the reaction of a naphthoquinone diazide sulfonic acid derivative compound and a phenol formaldehyde and an organic solvent; and

5 to 50% by weight of trimethylsilylnitrile based on the total weight of the solid content of the positive type resist solution.

4,686,281

NOVEL SYNTHETIC PEPTIDE, PROCESS FOR ITS PREPARATION AND MEDICAMENTS CONTAINING IT

Andre Dodin, Milly La Foret; Odile Siffert, Versailles; Georgette Le Thuillier, Morangis, and Patrice Allard, Paris, all of France, assignors to Institut Pasteur, Paris Cedex, France

Filed Aug. 24, 1984, Ser. No. 643,955

Claims priority, application France, Aug. 29, 1983, 83 13828

Int. Cl.[4] C07K *7/08*

U.S. Cl. 530—327 **1 Claim**

1. The peptide of the following formula I:

Gln—Ser—Leu—Gly—Val—Lys—Phe— (I)

—Leu—Asp—Glu—Tyr—Gln—Ser—Lys—Val.

4,686,282

IMMUNOTHERAPEUTIC POLYPEPTIDE AGENTS WHICH BLOCK IMMUNE COMPLEX BINDING TO IMMUNOGLOBULIN FC RECEPTORS

Gary S. Hahn, San Diego, Calif., assignor to Immunetech, Inc., San Diego, Calif.

Filed Aug. 12, 1983, Ser. No. 522,738

Int. Cl.[4] C07K *7/06, 7/08*

U.S. Cl. 530—327 **5 Claims**

1. An active site peptide which blocks immune complex binding to immunoglobulin Fc receptors, said peptide having an amino acid sequence

Thr-Val-Leu-His-Gin-Asn-Trp-Leu-Asp-Gly-Lys-Glu-Tyr-Val

and pharmaceutically acceptable salts thereof.

4,686,283

ANALOGS OF TRANSFORMING AND EPIDERMAL GROWTH FACTOR FRAGMENTS FOR THERAPY AND DIAGNOSIS

John J. Nestor, Jr., San Jose, and Alain B. Schreiber, Sunnyvale, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

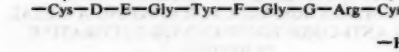
Filed Apr. 16, 1985, Ser. No. 723,785

Int. Cl.[4] C07K *7/06, 7/08*

U.S. Cl. 530—327 **33 Claims**

1. A compound represented by the formula

A—B—C— (I)



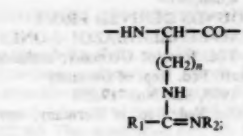
—Cys—D—E—Gly—Tyr—F—Gly—G—Arg—Cys—

—H—I—J,

the reduced form of said compound or a pharmaceutically acceptable salt of said compound, wherein

A is hydrogen, acyl of one to twelve carbon atoms, benzoyl, 3-(4-hydroxyphenyl)propionyl, or 3-(3,5-diiodo-4-hydroxyphenyl)propionyl;

B is a bond or a radical of the formula



(II)

C is $(Gly)_x$ or $(Ala)_x$;
D is Val or His;
E is Ser, Ile or Val;
F is val, Ser or Ile;
G is Val, Ala, Asp or Glu;
H is $(Gly)_y$ or $(Ala)_y$;
I is a bond or a radical represented by formula (II), but independent thereof; and
J is OR_7 or NHR_8,
wherein for B, C, H, I and J
n is an integer of two to five; each of x and y is independently an integer of zero to five;
R_1 is alkyl of one to twelve carbon carbon atoms or $—NRR_3$ wherein
R is hydrogen or lower alkyl and
R_3 is hydrogen, alkyl of one to twelve carbon atoms, lower fluoroalkyl, cycloalkyl, phenyl or benzyl;
R_2 is hydrogen, alkyl of one to twelve carbon atoms, lower fluoroalkyl, cycloalkyl, phenyl or benzyl
R_7 is lower alkyl or hydrogen, provided that R_7 is not hydrogen when
A is H, B is a bond and x is 0; and
R_8 is hydrogen, lower alkyl or lower fluoroalkyl.

4,686,284

PRODUCTION OF MONOMERIC HUMAN γ-INTERFERON

Kiyoshi Nara, Kyoto, and Susumu Honda, Takatsuki, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sep. 26, 1984, Ser. No. 654,789
Claims priority, application Japan, Oct. 4, 1983, 58-186383
Int. Cl.[4] C07K *15/26;* **A61K** *45/02*
U.S. Cl. 530—351 **15 Claims**

1. A method for producing monomeric human γ-interferon, which comprises subjecting crude human γ-interferon to gel filtration in the presence of a reducing sulfur compound and a protein-denaturing agent.

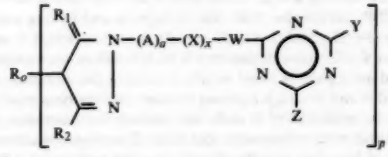
4,686,285

BASIC AZO AND NON-AZO COMPOUNDS HAVING ONE OR TWO DISUBSTITUTED 1,3,5-TRIAZINE RINGS EACH OF WHICH IS LINKED THROUGH A BRIDGING RADICAL TO THE 1-POSITION OF A PYRAZOLE RING

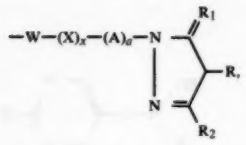
Reinhard Pedrazzi, Allschwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Feb. 8, 1985, Ser. No. 699,916
Claims priority, application Fed. Rep. of Germany, Feb. 10, 1984, 3404778
Int. Cl.[4] C09B *31/47, 35/08, 45/26, 44/08*
U.S. Cl. 534—606 **20 Claims**

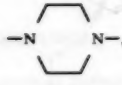
1. A metal-free compound of the formula



a 1:1 or 1:2 metal complex of a metallizable metal-free azo compound of said formula or a salt or acid addition salt of a metal-free compound of said formula or of a 1:1 or 1:2 metal complex of a metallizable metal-free azo compound of said formula,
wherein
R_o is R or $—N=N—T—N=N—$,
wherein T is the radical of a tetrazo component,
each Y is independently hydroxy; C_{1-4}alkoxy; phenoxy; amino; an aliphatic, cycloaliphatic, aromatic or heterocyclic amino group; Z or



and p is 1 when R_o is R and is 2 when R_o is $—N=N—T—N=N—$,
wherein
each A is independently phenylene; naphthylene; phenylene-phenylene; or phenylene, naphthylene or phenylene-phenylene each aromatic ring of which is substituted by 1 or 2 substituents selected from halo, nitro, C_{1-4}alkyl, C_{1-4}alkoxy, carboxy and sulfo,
each R is independently hydrogen or $D—N=N—$, wherein D is the radical of a diazo component,
each R_1 is independently O, NH or S,
each R_2 is independently C_{1-4}alkyl, C_{1-4}alkoxy, $—COOR_3$, $—CONR_4R_5$ or —CO—Z,
wherein R_3 is hydrogen, C_{1-4}alkyl, phenyl or cyclohexyl,
each of R_4 and R_5 is independently hydrogen; C_{1-4}alkyl; C_{2-4}alkyl monosubstituted in other than the the 1-position by hydroxy; or monosubstituted by cyano or chloro; phenyl; phenyl substituted by 1 or 2 substituents selected from methyl, ethyl, methoxy and ethoxy; phenyl(C_{1-4}alkyl) or phenyl(C_{1-4}alkyl) the phenyl group of which is substituted by 1 or 2 substituents selected from methyl, ethyl, methoxy and ethoxy; or cyclohexyl, and
Z is as defined below,
each W is independently $—NR_6—$ or



wherein R_6 is hydrogen; C_{1-4}alkyl; C_{2-4}alkyl monosubstituted in other than the 1-position by hydroxy or monosubstituted by cyano, chloro or C_{1-4}alkoxy; phenyl(C_{1-4}alkyl) or cyclohexyl,
each X is independently linear or branched C_{1-6}alkylene, —*-CONH-linear or branched C_{1-6}alkylene- or $—*SO_2NH$-linear or branched C_{1-6}alkylene, wherein the * denotes the atom attached to the $—(A)_o—$ radical,
each Z is independently an N-bonded organic radical containing 1 to 5 nitrogen atoms at least one of which has basic character or forms an ammonium cation,
each a is independently 0 or 1,
each x is independently 0 or 1, with the proviso that the sum of each adjacent a and x is 1 or 2, and
each halo is independently fluoro, chloro, bromo or iodo,
or a mixture thereof.

4,686,286

DISAZO REACTIVE DYESTUFFS FOR CELLULOSE FIBERS

Toshio Niwa, Yokohama, and Yoshiaki Katoh, Mitaka, both of Japan, assignors to Mitsubishi Chemical Industries Limited, Japan

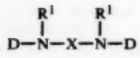
Filed May 17, 1985, Ser. No. 735,561

Claims priority, application Japan, Jun. 6, 1984, 59-116192; Jun. 6, 1984, 59-116193; Jun. 6, 1984, 59-116195; Jun. 6, 1984, 59-116196

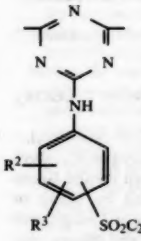
Int. Cl.[4] C09B *62/513*; D06P *1/384, 3/66*

U.S. Cl. 534—637 10 Claims

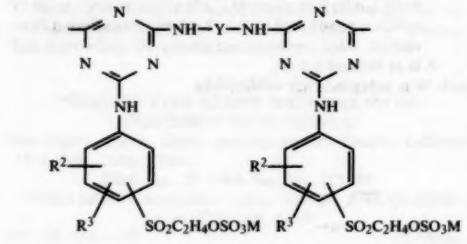
1. A disazo reactive dyestuff for cellulose fibers which is of the formula:



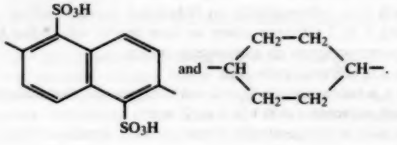
wherein D is a radical of a monoazo dye, R^1 is hydrogen or lower alkyl, and X is a group:



or



wherein R^2 and R^3 are each hydrogen, methyl, methoxy or $-SO_3M$, Y is a divalent radical selected from the group consisting of phenylene or phenylene substituted with methyl, methoxy, sulfonic acid, carboxylic acid radical, or chlorine, a linear alkylene group having 2 to 6 carbon atoms;



4,686,287

DISAZO COMPOUNDS DERIVED FROM ACETOACETYLAMINO-BENZIMIDAZOL-2-ONES

Klaus Hunger, Kelkheim, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

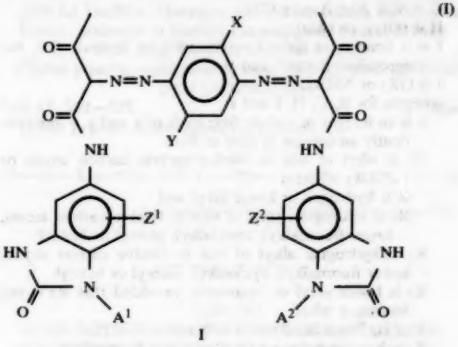
Filed Apr. 3, 1985, Ser. No. 719,255

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1984, 3412730

Int. Cl.[4] C09B *31/10, 35/035, 67/48*; D06P *1/44*

U.S. Cl. 534—742 9 Claims

1. A disazo compound of the formula I



(I)

I

in which X is hydrogen, bromine or chlorine or methyl, methoxy, ethoxy, nitro, trifluoromethyl, carbomethoxy or carboethoxy, Y is hydrogen, methyl, methoxy, ethoxy, nitro, trifluoromethyl, carbomethoxy, or carboethoxy, A^1 and A^2 each represent hydrogen or methyl or ethyl, and Z^1 and Z^2 in the 6- or 7-position of the heteroaromatic ring system each represent hydrogen, bromine or chlorine, methyl, methoxy, ethoxy, carbomethoxy, carboethoxy or nitro.

4,686,288

PROCESS FOR PREPARING MUCOPOLYSACCHARIDE COMPOSITIONS HAVING HIGH ANTITHROMBOTIC ACTIVITY, THE COMPOSITIONS OBTAINED AND THEIR USE AS MEDICAMENTS

Jean-Claude Lormeau, Maromme, and Jean Choay, Paris, both of France, assignors to D.R.O.P.I.C., Paris, France

Continuation-in-part of Ser. No. 323,567, Mar. 20, 1981, Pat. No. 4,500,519, which is a continuation-in-part of Ser. No. 204,505, Nov. 6, 1980, abandoned, which is a continuation of Ser. No. 91,164, Nov. 5, 1979, abandoned. This application Dec. 13, 1984, Ser. No. 681,017

Claims priority, application France, Mar. 20, 1980, 80 06282

Int. Cl.[4] C07H *1/00*; C08B *37/10*

U.S. Cl. 536—21 17 Claims

1. A process for the preparation of mucopolysaccharides having higher antithrombic activity and a lower ratio of YW/USP and lower YW titer than the starting mucopolysaccharides, which process comprises treating mucopolysaccharide fractions, having a high antithrombic activity and a ratio of YW/USP titers higher than that of heparin and having mucopolysaccharide chains which contain less than about 6 units with an acidic aqueous mixture which contains an inorganic salt and an organic solvent in which solvent the inorganic salt is miscible and in which aqueous mixture mucopolysaccharides which have chains of 6 units and greater are insoluble and recovering mucopolysaccharides free of mucopolysaccharide chains of less than 6 units, thereby having performed a fractionation of the starting mucopolysaccharides having an average higher molecular weight.

4,686,289

ANISOTROPIC COMPOUNDS AND LIQUID CRYSTAL MIXTURES

Tuong Huynh-Ba, Pully, and Maged A. Osman, Zürich, both of Switzerland, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Fed. Rep. of Germany

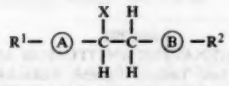
Continuation-in-part of Ser. No. 648,439, Sep. 10, 1984, Pat. No. 4,622,163. This application Feb. 25, 1986, Ser. No. 832,801

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1983, 3332691

Int. Cl.[4] C09K *10/30;* C07D *403/12;* C07C *121/46, 19/00, 21/66, 69/76, 43/225*

U.S. Cl. 544—224 17 Claims

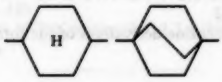
1. A compound of the formula



(I)

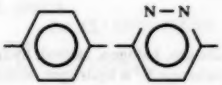
wherein x is cyano or halo,

A is a cycloaliphatic radical of the formula (1a) or (1b)



(1a) (1b)

B is a cycloaliphatic radical of the formula (1a) or (1b) or an aromatic radical of the formula (1c) or (1d)



(1c) (1d)

R^1 and R^2 are identical or different and each is a radical of the formula (1e)

(1e)

C has one of the meanings given for ring B,

R^3 is hydrogen, alkyl, alkoxy, alkoxy-carbonyl or alkylcarbonyloxy wherein the alkyl portion of each contains 1–12 C atoms, or such a C_{1-12}-group which carries one or more substituents which are halo or cyano, at most one of these substituents being attached to each atom of the carbon chain,

Z is a covalent bond or a bridge group of the formula —CH_2O—, —OCH_2—, —$C(X^1)(H)—CH_2$—, —$CH_2—C(X^1)(H)$—, —OOC— or —COO—,

X^1 is hydrogen or has one of the meanings given for X,

and m is 0 or 1,

with the provisos that

(a) groups of the formula —CH_2O— or —C(X)(H)— are not bonded directly via their C atoms to any aromatic radical of the formula (1c) or (1d) present in the molecule, except when X=F, and

(b) R^3 is not hydrogen if m is 0 or if C is cycloaliphatic.

4,686,290

PREPARATION OF PYRIMIDYL PHOSPHORIC ACID DERIVATIVES AND INTERMEDIATES

Fritz Maurer, Wuppertal, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,452

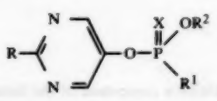
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1984, 3423623

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.[4] C07F *9/65;* C07D *239/36, 239/52, 239/54*

U.S. Cl. 544—243 6 Claims

1. A process for the preparation of a compound of the formula



in which

R is hydrogen, alkoxy having 1 to 12 carbon atoms, monoalkylamino or dialkylamino having 1 to 6 carbon atoms in each alkyl moiety, alkyl which has 1 to 12 carbon atoms and is optionally substituted by C_1–C_4-alkoxy or C_1–C_4-alkylsulphonyl, cycloalkyl which has 3 to 8 carbon atoms and is optionally substituted by C_1–C_4-alkyl, and aryl which has 6 to 10 carbon atoms and is optionally substituted by C_1–C_4-alkyl, C_1–C_4-alkoxy or C_1–C_4-alkylsulphonyl,

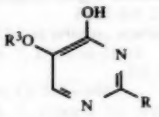
R^1 is C_1 to C_6-alkyl optionally substituted with C_1 to C_4-alkoxy, C_1 to C_4-alkylthio, halogen, cyano or nitro; alkylamino or dialkylamino having 1 to 6 carbon atoms in each alkyl moiety optionally substituted with C_1 to C_4-alkyl, C_1 to C_4-alkoxy, C_1 to C_4-alkylthio, halogen, cyano or nitro; C_1 to C_6 alkoxy optionally substituted with C_1 to C_4-alkyl, C_1 to C_4-alkoxy, C_1 to C_4-alkylthio, halogen, cyano or nitro; C_1 to C_6-alkylthio optionally substituted with C_1 to C_4-alkyl, C_1 to C_4-alkoxy, C_1 to C_4-alkylthio, halogen, cyano, or nitro; and phenyl,

R^2 is C_1 to C_6-alkyl optionally substituted with C_1 to C_4-alkoxy, C_1 to C_4-alkylthio, halogen, cyano or nitro, and

X is oxygen or sulphur,

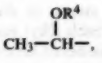
comprising

(a) reacting a compound of the formula



in which

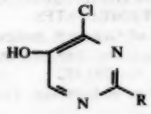
R^3 is hydrogen or



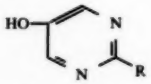
and

R^4 is C_1 to C_4-alkyl,

with a halogenating agent in the presence of an N,N-disubstituted amide at a temperature between 10° C. and 80° C., to produce a compound of the formula

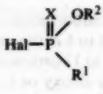


(b) reacting such compound with hydrogen in the presence of a hydrogenation catalyst, an acid acceptor and a diluent, at a temperature between 20° C. and 150° C., to produce a compound of the formula



and then

(c) reacting such compound with a compound of the formula



in which

Hal is halogen.

4,686,291

PREPARATION OF METHYL KETONES

Reinhard Lantzsch, Leverkusen, and Hans-Ludwig Elbe, Wuppertal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

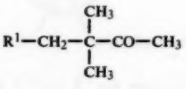
Continuation of Ser. No. 475,011, Mar. 14, 1983, abandoned. This application Nov. 26, 1985, Ser. No. 802,076

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1982, 3210725

Int. Cl.[4] **C07C** *45/61;* **C07D** *239/26, 213/46, 333/06*

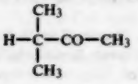
U.S. Cl. 544—335 **6 Claims**

1. A process for the preparation of a methyl ketone of the formula

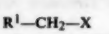


in which

R^1 is alkyl, having 1 to 6 carbon atoms, alkenyl having 2 to 6 carbon atoms, alkinyl having 2 to 4 carbon atoms, phenyl optionally substituted by halogen, alkyl having 1 to 4 carbon atoms, alkoxy or alkylthio, each having 1 to 2 carbon atoms, as well as halogenoalkyl, halogenoalkoxy and halogenoalkylthio, each having 1 to 2 carbon atoms or 1 to 5 identical or different halogen atoms, or dialkylamino having 1 to 4 carbon atoms in each alkyl part; or also R^1 represents 5-membered or 6-membered heteroaryl selected from the group consisting of pyridal, pyrimidinyl, furyl or thienyl, wherein each heteroaryl is unsubstituted or optionally substituted by alkyl having 1 to 2 carbon atoms or by halogen, comprising reacting at a temperature between about 0° and 150° C. a methyl sec.-alkyl ketone of the formula



with a halide of the formula



in which

X is halogen,

in the presence of a base, a diluent, and a phase-transfer catalyst.

4,686,292

BENZO[α]PHENAZINE ANTITUMOR AGENTS

Yoshihiro Migita, Ina; Tadashi Eguchi; Yukinari Kumazawa, both of Ohmiya; Jozi Nakagami, Ina; Takehiro Amano, Urawa; Kaoru Sota, Tokorozawa, and Jinsaku Sakakibara, Nagoya, all of Japan, assignors to Taisho Pharmaceutical Co., Ltd., Japan

Filed Mar. 10, 1986, Ser. No. 838,153

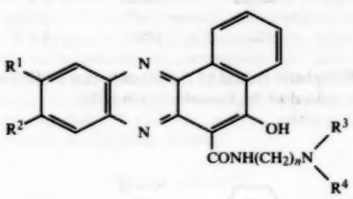
Claims priority, application Japan, Mar. 29, 1985, 60-65099

Int. Cl.[4] **A61K** *31/495;* **C07D** *241/46, 403/06, 401/06*

U.S. Cl. 544—343 **6 Claims**

1. Benzo[α]phenazine derivatives of the formula

(I)



wherein R^1 is hydrogen, halogen, methyl, hydroxyl or alkoxy, R^2 is —$COOR^5$ (wherein R^5 is hydrogen, straight or branched chain alkyl, cycloalk-yl having 3–6 carbon atoms, benzyl or phenyl) or

(wherein R^6 and R^7 are the same or different and are each hydrogen or lower alkyl, or R^6 and R^7 together with the nitrogen atom to which they are attached form pyrrolidine or piperidine), R^3 and R^4 are the same or different and are each hydrogen or lower alkyl, and n is an integer of 2 or 3, and the salts thereof.

4,686,293

CHEMICAL AGENTS

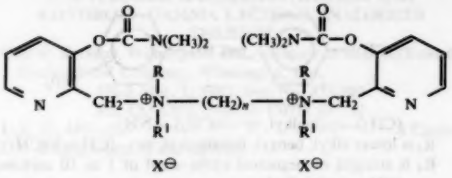
Harold Z. Sommer, Havre de Grace, and Omer O. Owens, Abingdon, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 29, 1967, Ser. No. 643,302

Int. Cl.[4] **C07O** *213/65;* **A61K** *31/44*

U.S. Cl. 546—261 **6 Claims**

1. A chemical compound having the generic formula:



wherein n is selected from 5–16, R, R′ are radicals selected from the group consisting of methyl, ethyl, propyl, isopropyl, butyl, and benzyl, and X is one equivalent of an anion selected from the group consisting of halide, hydrogen oxalate, perchlorate, hydrogen sulfate, and nitrate.

4,686,294

1,3,4-THIADIAZOLYL UREAS AND PROCESSES FOR CONTROLLING WEEDS AND WILD GRASSES THEREWITH

Karl Hoegerle, Basel; Hans J. Cellarius, Riehen; Paul Rathgeb, Basel, and Jürg Rumpf, Binningen, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Dec. 20, 1968, Ser. No. 785,762

Int. Cl.[4] C07D *285/12*

U.S. Cl. 548—140 **1 Claim**

1. N-[5-Trifluoromethyl-1,3,4-thiadiazol-2-yl]-N,N′-dimethyl urea.

4,686,295

N-CARBOXY ANHYDRIDE INTERMEDIATES

Raymond D. Youssefyeh, Tarrytown; Jerry W. Skiles, Tuckahoe, both of N.Y.; John T. Suh, Greenwich, Conn., and Howard Jones, Ossining, N.Y., assignors to USV Pharmaceutical Corporation, Fort Washington, Pa.

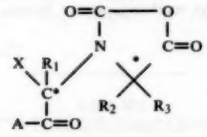
Filed Mar. 7, 1983, Ser. No. 472,551

Claims priority, application Canada, Mar. 10, 1982, 398031; Mar. 15, 1982, 398374

Int. Cl.[4] C07D *263/44*

U.S. Cl. 548—226 **11 Claims**

1. A compound of the formula:

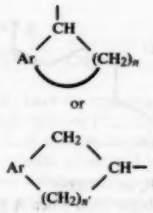


wherein

A is hydroxy, lower alkoxy, lower alkenoxy, diloweralkylamino lower alkoxy, acylamino lower alkoxy, acyloxy lower alkoxy, lower aryloxy, lower arloweralkyloxy, amino, loweralkylamino, diloweralkylamino, aryloweralkylamino, hydroxyamino, or substituted lower aryloxy, or substituted lower arloweralkoxy wherein the substituent is methyl, halo or methoxy;

R_1, R_2 and R_3 are each hydrogen, lower alkyl, lower alkenyl, lower alkynyl, lower aryl, fused lower aryl-lowercycloalkyl, lower arloweralkyl, lower cycloalkyl, substituted lower alkyl, lower alkenyl, or lower alkynyl groups in which the substituents are hydroxy, lower alkoxy, halo, amino, aminoloweralkyl, lower alkylamino, mercapto, or lower alkylmercapto, substituted lower cycloalkyl groups in which the substituents are lower alkyl, halo, haloloweralkyl, hydroxy, lower alkylamino, nitro or trifluoromethyl, and substituted lower aryl groups in which the substituents are lower alkyl, hydroxy, lower alkoxy, hydroxyloweralkyl, halo, mercapto, lower alkylmercapto, mercaptoloweralkyl, haloloweralkyl, amino, lower alkylamino, aminoloweralkyl, nitro, methylenedioxy, or trifluoromethyl;

X is hydrogen, lower alkyl, lower alkenyl or lower alkynyl of up to about 20 carbon atoms, lower aryl or lower aryl lower alkyl containing from about 7 to about 12 carbon atoms, heterocyclic or heterocyclic lower alkyl cycloalkyl or cycloalkylalkyl containing up to about 20 carbon atoms, or of the formula:



wherein

n=2, 3 or 4;

n′=1, 2 or 3; and

Ar is arylene or mono- or di-substituted arylene in which the substituent is halo, CF_3, lower alkyl, OH, lower alkoxy, mercapto, amino or sulfanyl, it being further provided that the heterocyclic group is selected from the group consisting of pyridinyl, piperidinyl, morpholinyl, pyrrolyl, pyrrolidinyl, thiomorpholinyl, quinolinyl, isoquinolinyl, tetrahydroquinolinyl, tetrahydroisoquinolinyl, thiazolidinyl, thiazolinyl, thiazolyl, imidazolidinyl, imidazolinyl, imidazolyl, thiophenyl, tetrahydrothiophenyl, furyl and tetrahydrofuranyl and arylene is selected from the group consisting of phenyl, α-naphthyl and β-naphthyl.

4,686,296

PROCESS FOR PRODUCING OXIRACETAM

Shinobu Iriuchijima; Hirohiko Kobayashi; Kyoji Aoki; Takeshi Oda, all of Tokyo; Masayuki Shinoyama, and Yoshifumi Nosaka, both of Niigata, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

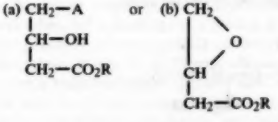
Filed Jul. 22, 1986, Ser. No. 889,428

Claims priority, application Japan, Jul. 26, 1985, 60-164019; Feb. 7, 1986, 61-23915

Int. Cl.[4] C07D *207/12*

U.S. Cl. 548—544 **15 Claims**

1. A process for producing oxiracetam which comprises reacting glycineamide with a butyric acid ester in a protonic solvent or an ethereal solvent at atmospheric pressure and at a temperature between 60° C. and 160° C. for a time period between one hour and 70 hours, which butyric acid ester is expressed by the formula (I)



wherein A represents Cl or Br and R represents an alkyl group with 1 to 4 carbon atoms.

4,686,297

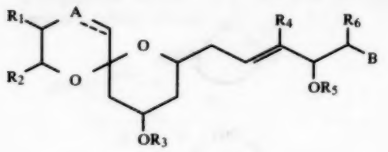
ANTHELMINTIC SPIROKETALS USEFUL FOR KILLING PARASITIC WORMS

Stephen J. Nelson, Kalamazoo County, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Jul. 22, 1985, Ser. No. 757,660
Int. Cl.[4] C07D *311/00*
U.S. Cl. 549—214 **6 Claims**

1. A compound of the formula:

XIX



wherein A is —CH, or —CH_2;
wherein is a single bond when A is —CH_2 and a double bond when A is —CH;
wherein B is —$CR_7R_8OR_9$ or —CHO;
wherein R_1, R_2, R_4, R_6, and R_8, being the same or different, are hydrogen or C_1–C_5 alkyl;
wherein R_3 is C_1–C_5 alkyl; benzoyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_3 alkoxy, halo, C_1–C_3 alkylthio, trifluoromethyl, nitro; phenyl(C_1–C_3)alkyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_4 alkoxy, halo, nitro or trifluoromethyl; C_2–C_6 alkoxyalkyl; C_2–C_6 alkylthioalkyl; C_1–C_6 alkanoyl; tetrahydropyranyl; C_1–C_4 alkyl diphenyl silyl; di(C_1–C_4 alkyl)phenyl silyl; or tri(C_1–C_4)alkyl silyl;
wherein R_5 is C_1–C_5 alkyl; benzoyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_3 alkoxy, halo, C_1–C_3 alkylthio, trifluoromethyl, nitro; phenyl(C_1–C_3)alkyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_4 alkoxy, halo, nitro or trifluoromethyl; C_2–C_6 alkoxyalkyl; C_1–C_6 alkanoyl; tetrahydropyranyl; C_1–C_4 alkyl diphenyl silyl; di(C_1–C_4 alkyl)phenyl silyl; or tri(C_1–C_4)alkyl silyl; or a mono- or disaccharide;
wherein R_7 is hydrogen, C_1–C_5 alkyl, or C_2–C_6 alkenyl;
wherein R_9 is hydrogen; C_1–C_5 alkyl; benzoyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_3 alkoxy, halo, C_1–C_3 alkylthio, trifluoromethyl, nitro; phenyl(C_1–C_3)alkyl optionally substituted with one, 2 or 3 C_1–C_4 alkyl, C_1–C_4 alkoxy, halo, nitro or trifluoromethyl; C_2–C_6 alkoxyalkyl; C_2–C_6 alkylthioalkyl; C_1–C_6 alkanoyl; tetrahydropyranyl; C_1–C_4 alkyl diphenyl silyl; di(C_1–C_4 alkyl)phenyl silyl; or tri(C_1–C_4)alkyl silyl;
with the overall proviso that either R_7 or R_8 is hydrogen.

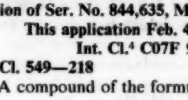
4,686,298

INTERMEDIATES FOR ALPHA-ACYLOXY PHOSPHONATE ANGIOTENSIN CONVERTING ENZYME INHIBITORS

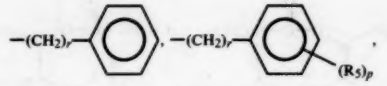
Donald S. Karanewsky, East Windsor, and Tamara Dejneka, Skillman, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 844,635, Mar. 27, 1986, Pat. No. 4,670,422. This application Feb. 4, 1987, Ser. No. 10,880
Int. Cl.[4] C07F *9/42, 9/58, 9/65*
U.S. Cl. 549—218 **8 Claims**

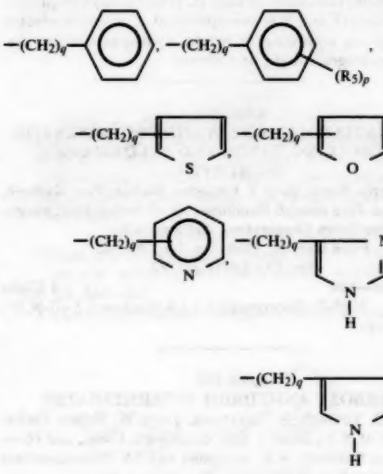
1. A compound of the formula



wherein
R_2 is lower alkyl,



—$(CH_2)_q$-cycloalkyl, or —$(CH_2)_r$—NH_2;
R_3 is lower alkyl, benzyl, benzhydryl, or —$(CH_2)_2Si(CH_3)_3$;
R_4 is straight or branched chain alkyl of 1 to 10 carbons, —$(CH_2)_q$-cycloalkyl,



or —$(CH_2)_r$—NH_2;
r is an integer from 1 to 7;
q is a zero or an integer from 1 to 7;
R_5 is lower alkyl of 1 to 4 carbons, lower alkoxy of 1 to 4 carbons, lower alkylthio of 1 to 4 carbons, chloro, bromo, fluoro, trifluoromethyl or hydroxy; and
p is one, two or three provided that p is more than one only if R_5 is methyl, methoxy, chloro, bromo, or fluoro.

4,686,299

AEROCAVIN ANTIBIOTICS

Wen-Chih Liu, Princeton Junction; William L. Parker, Pennington; Pushpa Singh, Piscataway, and Richard B. Sykes, Belle Mead, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 827,857, Feb. 10, 1986. This application Jul. 14, 1986, Ser. No. 885,983
Int. Cl.[4] C07D *313/00*
U.S. Cl. 549—271 **1 Claim**

1. The compound [3E,6E,9E,12α, 14β(R*)]-12-hydroxy-14-(2-hydroxyundecyl)-10-methyl-2-oxooxacyclotetradeca-3,6,9-triene-4-acetic acid having an optical rotation of about [α D^{22} = +25.1° (c=0.9, methanol), or a pharmaceutically acceptable salt thereof.

4,686,300

POLYFLUORO GAMMA-KETOESTERS AND 5-HYDROXY GAMMA LACTONE ANALOGUES THEREOF

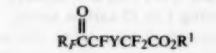
Carl G. Krespan, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 7, 1983, Ser. No. 472,985

Int. Cl.[4] C07C *149/16*; C07D *307/32*

U.S. Cl. 549—313 **5 Claims**

1. A compound of the formula



wherein

R_F is $—R^1_FX$,

where

R^1_F is a perfluoroalkylene group of 2–10 carbon atoms, optionally containing 1 or 2 in-chain ether oxygen atoms separated by at least 2 carbon atoms, and

X is $—SR^2$

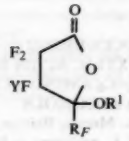
where

R^2 is $—CH_3$, $—C_2H_5$ or $—C_6H_5$;

R^1 is $—CH_3$, $—C_2H_5$, $—CH_2CF_3$ or $—CH_2(CF_2CF_2)_{1\text{-}6}H$; and

Y is —F or —Cl.

5. A compound of the formula



wherein

R_F is $—R^1_FX$,

where

R^1_F is a perfluoroalkylene group of 2–10 carbon atoms, optionally containing 1 or 2 in-chain ether oxygen atoms separated by at least 2 carbon atoms, and

X is $—SR^2$

where

R^2 is $—CH_3$, $—C_2H_5$ or $—C_6H_5$;

R^1 is $—CH_3$, $—C_2H_5$, $—CH_2CF_3$ or $—CH_2(CF_2CF_2)_{1\text{-}6}H$; and

Y is —F or —Cl.

4,686,301

PROCESS FOR THE PREPARATION OF 2,4-DINITROPHENOL ALKOXYALKYL ETHERS

Theodor Papenfuhs, and Friedrich Schophoff, both of Frankfurt am Main, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

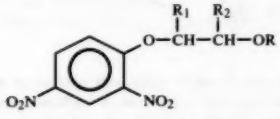
Filed Jun. 2, 1986, Ser. No. 869,238

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3519983

Int. Cl.[4] C07D *307/02, 315/00, 309/00*; C07C *41/01*

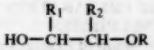
U.S. Cl. 549—427 **1 Claim**

1. A process for the preparation of 2,4-dinitrophenol alkoxyalkyl ethers of the formula (I)



(I)

in which R denotes a C_1–C_4-alkyl radical which is optionally substituted by C_1–C_4-alkoxy groups, or a phenyl radical which can be substituted by alkyl or alkoxy groups having in each case 1 to 4 carbon atoms or by chlorine or bromine atoms, or, together with R_2, denotes an alkylene bridge $—(CH_2)_n—$ in which n is the number 3 or 4, R_1 denotes a hydrogen atom or an alkyl radical having 1 to 4 carbon atoms, and R_2 represents a hydrogen atom or an alkyl radical having 1 to 4 carbon atoms, or, together with R, represents an alkylene bridge $—(CH_2)_n—$ in which n has the meaning mentioned, which comprises reacting 2,4-dinitrochlorobenzene with an alcohol of the formula (II)



(II)

in which R, R_1 and R_2 have the meanings mentioned above, in the presence of lithium oxide or lithium hydroxide at temperatures from 0° to 50° C., if appropriate neutralizing the reaction mixture with a non-volatile, weak acid which is soluble in the reaction medium, and subsequently removing by distillation the alcohol of the formula (II), present in excess, then adding sufficient water at 20° to 80° C. for the lithium chloride formed to dissolve completely, and separating off, from the aqueous salt phase, the 2,4-dinitrophenol alkoxyalkyl ether which has separated out in a solid or liquid phase.

4,686,302

SIMULTANEOUS PREPARATION OF NITRILES AND ACRYLAMIDE OR METHACRYLAMIDE

Franz Merger, Frankenthal, and Wolfgang Schwarz, Pfinztal, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 30, 1984, Ser. No. 677,036

Claims priority, application Fed. Rep. of Germany, Dec. 2, 1983, 3343673

The portion of the term of this patent subsequent to Jan. 6, 2004, has been disclaimed.

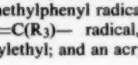
Int. Cl.[4] C07C *120/00, 102/08*

U.S. Cl. 558—314 **6 Claims**

1. A process for the simultaneous parparation of a nitrile of the formula I

$$R^1—CN \qquad (I)$$

where R^1 is a straight-chain or a branched-chain alkyl radical, or is a straight-chain or a branched-chain alkenyl radical, or is a cycloalkyl radical, or is an aralkyl radical or is an aryl radical, each of which is of not more than 20 carbon atoms and which radicals can be further substituted by halogen, lower alkoxy, lower alkoxycarbonyl or lower mono- or dialkylamino or R^1 is a 4-methylphenyl radical or a $HOCH_2C(CH_3)_2—$ radical or a $CH_2{=}C(R_3)—$ radical, where R_3 is cyclic alkyl, or 1-phenylethyl; and an acrylamide of the formula II

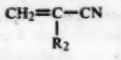


where R^2 is hydrogen or methyl, wherein an aldoxime of the formula III

$$R^1—CH{=}NOH \qquad (III)$$

where R^1 has the above meanings, with the proviso that R^1 can not be ethenyl when R^2 is hydrogen, is heated at from 50° to 180° C. in the presence of a copper(II) carboxylate obtained from a straight-chain or a branched-chain alkanoic acid, or a straight-chain or a branched-chain alkenoic acid, or a cycloalkyl carboxylic acid, or an aralkanoic, oxaalkanoic or aromatic carboxylic acid, where the aryl groups are hydrocarbyl, or alpha chloropropionic acid, or 1-phenylcyclopentane-1-carboxylic acid, or methoxyacetic acid, or 3,5-dichlorobenzoic

acid, said carboxylates being a total of 2 to 18 carbon atoms; and in the presence of an acrylonitrile of the formula IV



(IV)

where R^2 has the above meanings.

4,686,303

PROCESS FOR THE PREPARATION OF DIARYL SULPHIDES

Wolfgang Bauer, Maintal; Manfred Langer, Frankfurt am Main, and Winfried Sperling, Nidderau, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 26, 1986, Ser. No. 879,081

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1985, 3524095

Int. Cl.[4] C07C *149/30, 149/34, 149/40*

U.S. Cl. 560—18 **15 Claims**

1. In the process for preparation of diaryl sulphides by reaction of an aromatic diazonium salt in alkaline medium with an arenethiol in the presence of a catalyst,

the improvement comprises said catalyst being a non-metallic solid with a specific surface of greater than or equal to 0.02 m^2/cm^3.

4,686,304

CARBAMATE COMPOUNDS

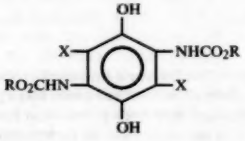
Stephen J. Backlund, Fair Oak, and Robert E. Olsen, Placerville, both of Calif., assignors to United States of America, Washington, D.C.

Continuation of Ser. No. 182,632, Aug. 29, 1980, Pat. No. 4,337,196. This application Jan. 20, 1982, Ser. No. 341,123

Int. Cl.[4] C07C *125/073*

U.S. Cl. 560—25 **3 Claims**

1. The compound of the formula



wherein X is chloride, fluoride, bromide, iodide or alkoxy, and R is alkyl, arylalkyl, or phenyl.

4,686,305

4'-SUBSTITUTED-PHENYL α-METHYL-β-(4-SUBSTITUTED-PHENYL) PROPIONATES

Shigeru Sugimori, Fujisawa, Japan, assignor to Chisso Corporation, Osaka, Japan

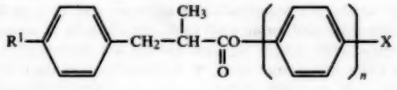
Filed Mar. 7, 1985, Ser. No. 709,398

Claims priority, application Japan, Mar. 7, 1984, 59-43619; Mar. 22, 1984, 59-54956; Mar. 24, 1984, 59-56925

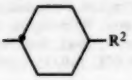
Int. Cl.[4] C07C *69/76*

U.S. Cl. 560—75 **4 Claims**

1. 4-Substituted-phenyl α-methyl-β-(4-substituted-phenyl)-propionates expressed by the general formula



wherein R^1 represents an alkyl group or an alkoxy group each having 1 to 15 carbon atoms; n is 1 or 2; and X represnts



wherein R^2 represents an alkyl group or an alkyoxy group having 1 to 15 carbon atoms, when n is 1, or F, Cl, CN, an alkyl group or an alkoxy group each having 1 to 15 carbon atoms, when n is 2.

4,686,306

Patent Not Issued For This Number

4,686,307

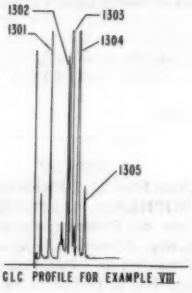
PREPARATION OF NATURALLY-OCCURRING C_2–C_5 ALKYL ESTERS OF C_4–C_5 CARBOXYLIC ACIDS BY MEANS OF FERMENTATION OF C_5–C_6 AMINO ACIDS IN THE PRESENCE OF C_2–C_5 ALCOHOLS

Mohamad I. Farbood, Holmdel; James A. Morris, Belmar, and Eugene W. Seitz, Middletown, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Apr. 11, 1986, Ser. No. 850,582

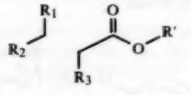
Int. Cl.[4] C07C *69/533;* **C12P** *7/62*

U.S. Cl. 560—205 **6 Claims**

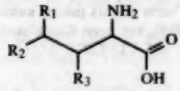


GLC PROFILE FOR EXAMPLE VIII

1. An ester-containing product containing esters defined according to the generic structure:



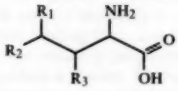
wherein R_1, R_2 and R_3 each represents methyl or hydrogen; wherein the dashed line represents a carbon-carbon single bond or a carbon-carbon double bond and wherein R' represents C_2–C_5 alkyl produced according to the process comprising the step of reacting an amino acid having the structure:



which amino acid is selected from the group consisting of leucine, valine and isoleucine, with a C_2–C_5 alkanol in the presence of a fermentation organism capable of producing at least one of said esters, selected from the group consisting of:

Candida krusei, ATCC 2159;
Ceratocystis moniliformis, ATCC 12861;
Geotrichum fragrans, ATCC 11247;
Geotrichum fragrans, ATCC 24512;
Geotrichum suaveolens, CBS 38236;
Hansenula saturnus (*H. suaveolens*), ATCC 9847;
Hansenula subpelliculosa, ATCC 14462;
Kloeckera apiculata, ATCC 9774;
Kloeckera apiculata, ATCC 10639;
Kloeckera apiculata, ATCC 10634;
Schizosaccharomyces pombe, ATCC 2476;
Schizosaccharomyces pombe, ATCC 2478; and
Sporobolomyces odorus (*sporobolomyces salmonicolor*), ATCC 26697;

said reaction taking place by bubbling air through the reaction mass containing one of the amino acids defined according to the structure:



and a C_2–C_5 alkanol, said reaction taking place in the presence of a carbon source selected from the group consisting of

Dextrose;
Maltose;
Lactose;
Fructose;
Sucrose;
Black strap molasses;
Corn syrup;
Corn syrup solids; and
Corn starch,

the concentration range of the amino acid varying from about 0.1% up to 4.0% by weight of the total contents of the reaction mass; the concentration of carbon source in the reaction mass varying from about 0.5% up to about 8.0%; the reaction taking place at a pH of from about 4.0 up to about 7.5 at a temperature of from about 20° C. up to about 35° C.; the time of fermentation varying from about 20 hours up to about 100 hours, said ester containing product having a GLC profile set forth, in the alternative, in:

FIG. 7;
FIG. 8;
FIG. 11;
FIG. 12;
FIG. 13; or
FIG. 14.

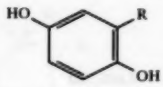
4,686,308

NOVEL PHYSIOLOGICALLY ACTIVE SUBSTANCE MH435

Hamao Umezawa; Tomio Takeuchi; Masa Hamada; Hiroshi Naganawa, all of Tokyo; Tsutomu Sawa, Ayase; Masaya Imoto, Urawa; Hironobu Iinuma, Wako; Takeshi Uchida, Takasaki, and Kunio Isshiki, Fujisawa, all of Japan, assignors to Microbial Chemistry Research Foundation, Tokyo, Japan

Filed Jun. 26, 1986, Ser. No. 879,069
Claims priority, application Japan, Jul. 4, 1985, 60-147039
Int. Cl.[4] C07C *103/34*
U.S. Cl. 564—219 **3 Claims**

1. A physiologically active substance, MH435, represented by the formula:



(I)

wherein R represents either of the following groups A and B

A: —CH=CH—NHCHO
B: —CH_2—CH_2—NHCHO.

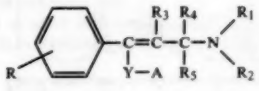
4,686,309

3-PHENYL-2-PROPENEAMINE DERIVATIVES, THEIR PREPARATION AND COMPOSITIONS CONTAINING THEM

Jean-Claude Barriere, Massy; Jean-Pierre Corbet, Ecully; Claude Cotrel, Paris; Daniel Farge, Thiais, and Jean-Marc Paris, Vaires S/Marne, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

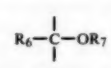
Filed Feb. 15, 1985, Ser. No. 702,088
Claims priority, application France, Feb. 16, 1984, 84 02338
Int. Cl.[4] C07C *91/16, 67/02;* C07D *211/70*
U.S. Cl. 564—355 **10 Claims**

1. A 3-phenyl-2-propeneamine of the formula:



(I)

in which R denotes hydrogen, halogen, alkyl, alkyloxy, alkylthio, amino, alkylamino, dialkylamino or trifluoromethyl, R_3 denotes hydrogen or alkyl; either R_4 and R_5 each denote hydrogen and R_1 and R_2, which are identical or different, each denote hydrogen or alkyl which is unsubstituted or substituted by alkenyl of 2 to 4 carbon atoms, or R_1 and R_2 form together with the nitrogen atom to which they are linked or saturated heterocyclic radical of 4 to 7 ring atoms optionally containing another heteroatom selected from the group consisting of oxygen, sulphur or nitrogen which is unsubstituted or substituted by alkyl; or R_4 denotes hydrogen, R_1 denotes hydrogen or alkyl and R_2 and R_5 together form an alkylene radical 3 or 4 carbon atoms; and either (i)A denotes phenyl which is unsubstituted or substituted by one or two substituents chosen from halogen, alkyl, alkyloxy, alkylthio, amino, alkylamino, dialkylamino, nitro and trifluoromethyl, pyridyl, benzyl or cycloalkyl of 3 to 6 carbon atoms, and Y denotes sulphur, sulphinyl, sulphonyl or a radical of the formula:



(II)

in which R_6 denotes hydrogen or alkyl and R_7 denotes hydrogen, alkylcarbonyl, alkyloxycarbonyl, alkylaminocarbonyl or benzoyl, which is unsubstituted or substituted by one or two

substituents chosen from halogen, alkyl, alkyloxy, alkylthio, amino, alkylamino, dialkylamino, nitro and trifluoromethyl, or (ii) Y and A together form a 1-hydroxycycloalkyl radical the ring of which contains 5 or 6 carbon atoms, optionally joined to a benzene ring; and its pharmaceutically acceptable salts, the aforesaid alkyl radicals and alkyl parts containing 1 to 4 carbon atoms each as a straight or branched chain, in the form of any geometric or optical isomer or any mixture thereof.

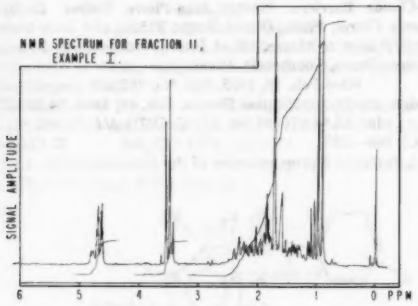
4,686,310
2-ISOPROPENYL-5-METHYLCYCLOPENTANEALKANOLS DERIVATIVES AND ORGANOLEPTIC USES OR SAME

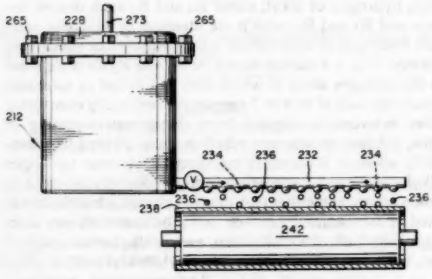
John B. Hall, Rumson, N.J., assignor to International Flavors & Fragrances Inc., New York, N.Y.

Division of Ser. No. 698,862, Feb. 6, 1985. This application May 29, 1986, Ser. No. 868,044

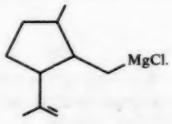
Int. Cl.[4] C07C *35/06*

U.S. Cl. 568—838 **5 Claims**





1. The compound having the structure:



4,686,311
DEHYDROHALOGENATION OF HALOETHYL BROMINATED BENZENES

Philip F. Jackisch, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 130,119, Mar. 13, 1980, Pat. No. 4,423,262. This application Sep. 27, 1983, Ser. No. 536,361

The portion of the term of this patent subsequent to Dec. 27, 2000, has been disclaimed.

Int. Cl.[4] C07C *17/34*

U.S. Cl. 570—193 **19 Claims**

1. A process for the preparation of a bromostyrene, said process comprising heating a haloethyl bromobenzene other than 2-bromoethyl dibromobenzene at a temperature sufficient to dehydrohalogenate and form a bromostyrene, said process being conducted in the presence of an alkaline mixture of

(i) a promoter quantity of aqueous t-alkoxide ion, and

(ii) a catalytic quantity of a phase transfer catalyst.

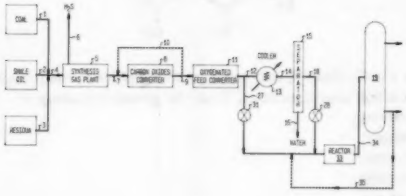
4,686,312
AROMATICS PRODUCTION

Yung-Feng Chu, and Arthur W. Chester, both of Cherry Hill, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 577,721, Feb. 6, 1984, abandoned, which is a continuation of Ser. No. 333,844, Dec. 23, 1981, abandoned. This application Oct. 23, 1986, Ser. No. 922,230

Int. Cl.[4] C07C *1/20*

U.S. Cl. 585—315 **10 Claims**



1. A multistage process for converting lower aliphatic oxygenated hydrocarbon feedstock to hydrocarbon product rich in benzene, toluene and/or xylene which comprises:

contacting said oxygenated hydrocarbons in a primary stage with a medium pore shape selective acidic zeolite to an intermediate hydrocarbon product comprising predominantly aliphatic hydrocarbons;

contacting at least a portion of the aliphatic hydrocarbons from the primary stage with a secondary stage catalyst comprising gallium-promoted medium pore shape selective zeolite characterized by a constraint index within the approximate range of 1 to 12 and a silica to alumina ratio of about 20 to 100:1; thereby producing benzene, toluene, xylene and C_9^+ aromatic hydrocarbons;

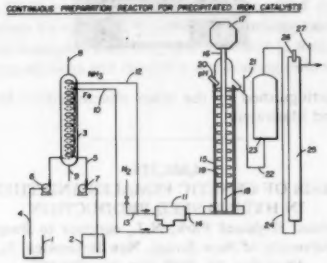
fractionating to recover a C_9^+ aromatic-rich stream;

and recycling said C_9^+ aromatic stream to the secondary stage for further reaction in contact with the metal-promoted catalyst.

4,686,313
LOW NITROGEN IRON-CONTAINING FISCHER-TROPSCH CATALYST AND CONVERSION OF SYNTHESIS GAS THEREWITH

Weldon K. Bell, Pennington; Werner O. Haag, Lawrenceville; Garry W. Kirker, Sewell, and Donald J. Klocke, Somerdale, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 687,695, Dec. 31, 1984, Pat. No. 4,617,288. This application Jun. 2, 1986, Ser. No. 869,649
Int. Cl.[4] C07C *1/04*
U.S. Cl. 585—327 **24 Claims**



1. In a process for converting syngas to hydrocarbons comprising:

(a) contacting an iron-containing Fischer-Tropsch catalyst with a syngas stream under conditions effective to achieve high conversion of said syngas to substantial amounts of C_3+ carbon compounds;

(b) contacting the effluent stream from (a) with a shape-selective crystalline zeolite having a Constraint Index of about 1 to 12; and

(c) recovering from the effluent stream of (b) gasoline and distillate materials; the improvement which comprises preparing said iron-containing Fischer-Tropsch catalyst by a process which continuously precipitates an aqueous solution containing iron nitrate with aqueous ammonia at a pH of about 6.5 to 6.9 and a temperature ranging from about 70° to 100° C. and thereafter washing the resulting precipitate with an aqueous wash solution to produce a Fischer-Tropsch catalyst containing less than about 500 ppm nitrogen.

4,686,314
CATALYSTS HAVING ALKOXIDE-MODIFIED SUPPORTS

Clayton D. Wood, Framingham, Mass. and Arthur E. Read, Jr., Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 655,991, Sep. 28, 1984, Pat. No. 4,559,364, which is a division of Ser. No. 567,112, Dec. 30, 1983, abandoned. This application Dec. 16, 1985, Ser. No. 809,544
Int. Cl.[4] C07C *5/03*
U.S. Cl. 585—260 **19 Claims**

1. A process for selectively hydrogenating a hydrocarbon feed composition comprising at least one alkene and at least one alkyne, the process comprising contacting the hydrocarbon composition with hydrogen in the presence of a catalyst composition under reaction conditions sufficient to hydrogenate the alkyne without substantially hydrogenating the alkene; wherein said catalyst composition comprises a catalytic metal and an alkoxide-modified support, which support comprises a core support material having (a) a surface area of at least about 5 m^2/g; and having (b) on the outer surface thereof a metal oxide produced from a precursor metal alkoxide.

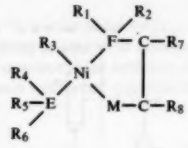
4,686,315
OLIGOMERIZATION OF ETHYLENE USING NICKEL YLIDE/ALKYL ALUMINUM ALKOXIDE CATALYST

David L. Beach, Kingwood, Tex., and Yury V. Kissin, East Brunswick, N.J., assignors to Chevron Research Company, San Francisco, Calif.

Filed Dec. 12, 1986, Ser. No. 940,826
Int. Cl.[4] C07C *2/02, 2/36*
U.S. Cl. 585—513 **31 Claims**

1. A process for oligomerizing ethylene to normal alpha olefins which comprises reacting ethylene under oligomerization conditions in contact with a bicomponent catalyst comprising:

(a) a nickel ylide defined by the following formula:



wherein R_1, R_2, R_3, R_4, R_5, R_6, R_7 and R_8 are either alike or different members selected from the group consisting of hydrogen, alkyl radicals having from about 1 to about 24 carbon atoms, aryl radicals having from about 6 to about 20 carbon atoms, alkenyl radicals having from about 2 to about 30 carbon atoms, cycloalkyl radicals having from about 3 to about 40 carbon atoms, aralkyl and alkaryl radicals having from about 6 to about 40 carbon atoms, halogen radicals, hydroxyl, alkoxy and aryloxy groups, and hydrocarbyl groups carrying halogen, hydroxyl, alkoxy or aryloxy groups, provided that at least one of each R_1 to R_8 radicals is a sulfonato group or an alkyl, aryl, alkenyl, cycloalkyl, aralkyl or alkaryl carrying a sulfonato group, M is sulfur or oxygen, E is phosphorus, arsenic, antimony or nitrogen and F is phosphorus, arsenic or antimony; and

(b) an alkyl aluminum alkoxide or mixtures of alkylaluminum alkoxides defined by the following formula:

$$(R^1)_nAl(OR^2)_{3-n}$$

where R^1 is an alkyl of 1 to 10 carbon atoms, R^2 is an aliphatic group of 1 to 12 carbon atoms, and n is 1, 2 or 3; to obtain a reaction product containing normal alpha olefins.

4,686,316
PRODUCTION OF BUTANES FROM PROPANE

Roger A. Morrison, Deptford, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 28, 1986, Ser. No. 845,284
Int. Cl.[4] C07C *6/10*
U.S. Cl. 585—708 **10 Claims**

1. A process for the production of butanes from propane, which process comprises contacting a propane feed in the absence of added hydrogen and at a pressure of at least about 50 psig with a catalyst comprising a crystalline zeolite having a silica-to-alumina ratio of at least 12 and a Constraint Index of 1 to 12 measured at a temperature within the range of 290° C. to about 538° C., said contacting being conducted under a combination of conditions of temperature, pressure, and WHSV effective to convert up to about 25 wt% of said propane to a mixture of hydrocarbons that contains butanes in an amount equal to at least 35 wt% of said converted propane, and,

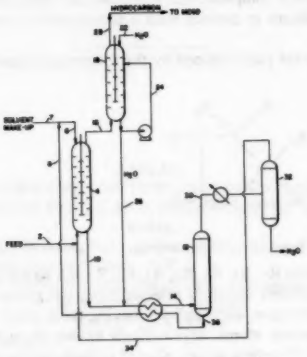
recovering said butanes.

4,686,317

PROCESS FOR REMOVING OXYGENATED COMPOUNDS OR OTHER IMPURITIES FROM HYDROCARBON STREAMS

Richard J. Quann, Moorestown, and Samuel A. Tabak, Wenonah, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 31, 1985, Ser. No. 815,342
Int. Cl.[4] C07C *15/00*
U.S. Cl. 585—860 **6 Claims**



1. A process for removing oxygenated impurities including alcohol, aldehyde, ketone or acid from an olefinic hydrocarbon stream comprising a C_4–C_9 naphtha fraction obtained by Fischer-Tropsch conversion of synthesis gas, said process comprising contacting said hydrocarbon stream under conditions of liquid-liquid extraction with polar organic solvent which comprises approximately equal parts by weight of propylene carbonate and 2-aminoethanol.

4,686,318

KIWIFRUIT PLANT

Marcus J. Wilkins, and Jan Wilkins, both of Pongakawa, Warwick Farm R.D. 6, Te Puke, New Zealand

Filed Mar. 27, 1986, Ser. No. 844,920
Int. Cl.[4] A01H *5/03*
U.S. Cl. 800—1 **2 Claims**

1. Fruit of the plant of the new and distinct variety of Kiwifruit named 'WILKINS SUPER' said plant being primarily distinguished by having fruit with a long and substantially cylindrical shape as compared to the 'Hayward' Variety and

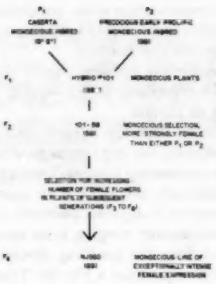
further distinguished by the other characteristics herein described and illustrated.

4,686,319

SYNTHESIS OF GENETIC FEMALES AND THEIR USE IN HYBRID SEED PRODUCTION

Oved Shifriss, Highland Park, N.J., assignor to Rutgers, The State University of New Jersey, New Brunswick, N.J.

Filed Sep. 25, 1985, Ser. No. 779,836
Int. Cl.[4] A01H *1/02*
U.S. Cl. 800—1 **59 Claims**



1. A process for synthesizing true-breeding female lines of squash comprising:

(a) selecting one monocious variety or inbred as seed parent (P_1) and another monoecious variety or inbred as the pollen parent (P_2), at least one of which is strongly female, said parents being different in breeding history and in genetic makeup;

(b) crossing P_1 and P_2;

(c) growing F_1 generation from the seed resulting from step (b);

(d) self pollination of the F_1 generation;

(e) growing F_2 generation plants from the seeds resulting from step (d);

(f) selecting an F_2 segregate which has very strong female expression or is female; and

(g) developing a true-breeding female line from said segregate through selection and self-pollination in subsequent filial generation.

4,686,320

ELECTRONICALLY AND IONICALLY CONDUCTING ELECTRODES FOR THERMOELECTRIC GENERATORS

Robert F. Novak, Farmington Hills, Mich., and Neill Weber, Murray, Utah, assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1985, Ser. No. 813,891
Int. Cl.[4] H01L *35/14*
U.S. Cl. 136—239 23 Claims

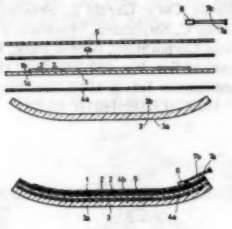
1. A composite article comprising a cermet electrode on solid electrolyte, said porous cermet electrode (i) having a thickness of at least 10 microns, (ii) comprising beta-type-alumina and refractory metal, (iii) being continuously electronically conducting, (iv) having a surface resistance of less than about 30 ohms/square, and (v) being applied to said solid electrolyte by spraying a powder comprising said beta-type-alumina through a source of heat sufficient to melt at least the beta-type-alumina and deposit it as a coating onto said electrolyte.

4,686,321

PHOTOVOLTAIC DEVICE AND METHOD OF MANUFACTURING THEREOF

Yasuo Kishi, Osaka, Japan, assignor to Sanyo Electric Co., Ltd., Japan

Filed Jun. 25, 1986, Ser. No. 878,118
Claims priority, application Japan, Jul. 2, 1985, 60-145364
Int. Cl.[4] H01L *25/02, 31/18*
U.S. Cl. 136—244 10 Claims



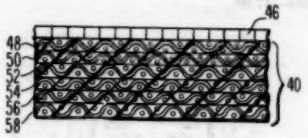
1. A photovoltaic device comprising:
a curved and transparent light receiving plate,
a transparent supporting substrate, one surface thereof adhered to one curved surface of said light receiving plate through an adhesive sheet, and
a plurality of film-shaped photoelectric conversion elements formed on the other surface of said supporting substrate,
said supporting substrate being formed of a rigid material not easily curved,
said photoelectric conversion elements being formed in advance on said other surface of said supporting substrate in a flat shape prior to adhesion of said supporting substrate to said light receiving plate, pressure being applied to said flat-shaped supporting substrate and said light receiving plate oppositely so that said supporting substrate is curved along one curved surface of said light receiving plate, whereby said supporting substrate adheres to said curved surface of said light receiving plate.

4,686,322

SOLAR PANEL

Erich F. Kujas, Philadelphia, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 12, 1985, Ser. No. 764,572
Int. Cl.[4] H01L *25/02*
U.S. Cl. 136—245 7 Claims



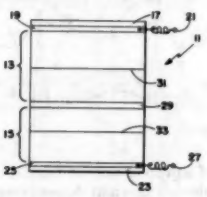
1. In a solar panel having a substrate with a face surface and an array of solar cells attached to the face surface the improvement wherein the substrate is comprised of at least one ply of a resin reinforced novoloid fabric.

4,686,323

MULTIPLE CELL, TWO TERMINAL PHOTOVOLTAIC DEVICE EMPLOYING CONDUCTIVELY ADHERED CELLS

William J. Biter, Hudson, and Gerald P. Ceasar, Chagrin Falls, both of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Jun. 30, 1986, Ser. No. 879,883
Int. Cl.[4] H01L *31/06, 31/18*
U.S. Cl. 136—249 36 Claims



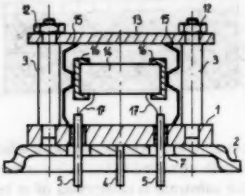
22. A multiple cell, two terminal photovoltaic device comprising a first photovoltaic cell formed of a thin film non-monocrystalline semiconductor material disposed on a first light-transmissive substrate and having a first electrical terminal connected to said first cell adjacent said first substrate, said first cell absorbing light having energies exceeding a first energy, a second photovoltaic cell formed of a thin film polycrystalline, semiconductor material, disposed on a second substrate and having a second electrical terminal connected to said second cell adjacent said second substrate, said second cell absorbing light having energies exceeding a second energy, said second energy being smaller than said first energy, said first and second cells being bonded together opposite said first and second substrates by an electrically conductive, light-transmissive adhesive.

4,686,324

COLD-SEAL PACKAGE FOR WITHSTANDING HIGH TEMPERATURES

André Debaisieux, Maison Laffitte, and Jean P. Aubry, Asnieres, both of France, assignors to Compagnie d'Electronique et de Piezo-Electricite, Argenteuil, France

Filed Jul. 24, 1985, Ser. No. 758,542
Claims priority, application France, Jul. 27, 1984, 84 11969
Int. Cl.[4] H05K *5/06*
U.S. Cl. 174—17.05 **12 Claims**



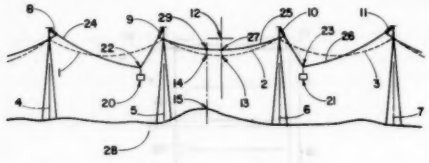
1. A cold-seal package affording resistance to high temperatures and comprising an element to be protected, a base and a cover provided with an annular flange and so designed as to be brought into contact with each other in such a manner as to permit cold-sealing and encapsulation of said element, the base being provided with at least two bores into which connector pins are inserted in order to establish electrical connections with said element, wherein said base comprises a cup and a metallic mounting-plate, the connector-pins being rigidly fixed to said mounting-plate and insulated with respect to this latter, said package being a vacuum-tight case comprising at least two columns located within the cover and rigidly fixed to said mounting-plate in order to suspend said element, and a ground pin brazed to said cup.

4,686,325

CATENARY SAG ADJUSTMENT USING ADDED WEIGHTS

Ronald Marsico, 935 Loch Ness Ave., Worthington, Ohio 43085, and Bruce Freimark, 814 Francis Ave., Bexley, Ohio 43209

Filed May 16, 1986, Ser. No. 864,075
Int. Cl.[4] H02G *7/00*
U.S. Cl. 174—40 R **6 Claims**



1. A method of adjusting normal flexible conductor, cable, strand, or wire catenary sags and shapes comprising the step of permanently adding and attaching essentially concentrated weights or weight of appropriate magnitude and position on conductors, cables, strands, or wires in spans immediately adjacent to a span in which it is desired to reduce sag and thereby increase clearances at certain locations to underlying lands, roads, waters, and other objects.

4,686,326

WIRE TERMINAL

Donald S. Rich, 15 Buttonwood Dr., Long Valley, N.J. 07853

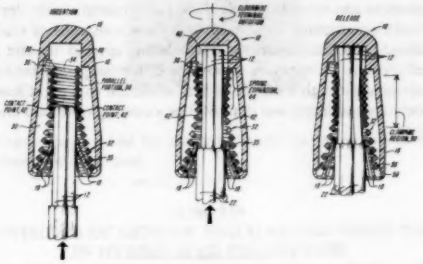
Filed Feb. 6, 1986, Ser. No. 826,801
Int. Cl.[4] H01R *4/22*
U.S. Cl. 174—87 **10 Claims**

1. A wire terminal for the electrical connection of wires or conductors comprising:

an electrically non-conductive housing having an interior cavity, and an apertured base and slot at the top of said cavity;

a helical spring having a top end permanently retained in said slot such that torque is always transmitted to the top end of the spring upon insertion of wires into said terminal and upon a twist of said terminal in a predetermined direction, and,

space between said housing and an intermediate portion of said spring to permit expansion upon insertion of wires, such that upon first twist of said terminal an upper portion



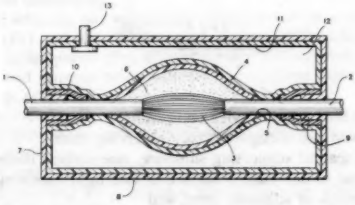
of said spring expands radially within said cavity upon at least momentary contact between the inserted wires and an intermediate portion of said spring thus permitting further insertion of the wires, and such that upon release of said terminal, said spring collapses down upon the inserted wires for a tight secure connection along a number of turns of said spring such that there is contact by said spring with respect to the inserted wires over an extended distance, the bottom of said spring being free to move rotationally at least to a limited extent.

4,686,327

PROTECTION OF CABLE SPLICE

Christian A. M. Debbaut, Cary; Gerald L. Shimirak, Raleigh, both of N.C., and John C. Swinmurn, Mountain View, Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 652,359, Sep. 18, 1984, abandoned. This application Jul. 1, 1985, Ser. No. 751,762
Int. Cl.[4] H02G *15/08;* **H01R** *43/033*
U.S. Cl. 174—88 R **3 Claims**



1. A splice assembly connecting at least two multi-conductor electrical cables from ingress of water comprising:

(a) a splice connecting at least two multi-conductor electrical cables, which have a jacket thereon adjacent the splices;

(b) a closure enclosing and surrounding the splice area having end portions sealed to the cable jackets and having sufficient strength to contain an expanding pressure means;

(c) heat recoverable sealing means sealing the end portions of the closure to the cable jacket; and

(d) an expanding pressure means positioned between the

splice and the closure and being capable of exerting sufficient pressure on a reservoir of liquid sealant positioned around the splice to force the liquid sealant to penetrate into the splice and the interstices between the conductors in the cables, of exerting pressure on the heat recoverable sealing means and of being activated and of being controlled from outside the closure.

3. A method for protecting a splice connecting at least two multiconductor electrical cables from ingress of water which comprises:

(a) forming a reservoir around the splice area, sealing the reservoir to the cable jackets, filling the reservoir with sufficient liquid sealant to encapsulate the splice and closing the reservoir;

(b) positioning end portions of a closure and sealing the end portions to the cable jacket with a heat recoverable sealing means;

(c) positioning a closure and an expandable pressure means around the reservoir and said end portion of the closure, wherein the expandable pressure means is positioned between the reservoir and the enclosure;

(d) pressurizing the pressure means to a pressure sufficient to force the liquid sealant to penetrate into said splice and into the interstices between the conductors in the cables and to cause the pressure means to exert pressure on the said heat recoverable sealing means; and

(e) maintaining said pressure in the enclosed area for a period of time to permit the liquid sealant to harden.

4,686,328

HERMETICALLY SEALED CONNECTOR FOR GLOVE BOX AND METHOD FOR EXCHANGING SUCH CONNECTORS

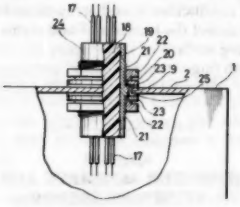
Masahito Ui; Hideo Akiyama; Akio Todokoro; Yukio Natsui; Hiroshi Kogure; Yujiro Kato, and Tsuneo Ozaki, all of Ibaraki, Japan, assignors to Doryokuro Kakunenryo Kaihatsu Jigyodan and Hitachi Cable Ltd., both of Tokyo, Japan

Filed Apr. 20, 1984, Ser. No. 602,585

Claims priority, application Japan, Apr. 30, 1983, 58-76868

Int. Cl.[4] H01B *17/26*

U.S. Cl. 174—153 R **3 Claims**



1. A hermetically sealed connector device for a glove box for hazardous material comprising: a central cylindrical member **19** having electrical wires **17** passing therethrough; a flange portion **20** provided integrally with said central cylindrical member at a point between the ends of the cylindrical member, said flange portion having an outer diameter greater than the outer diameter of the other portions of said cylindrical member; a sealing member **25** adapted to be in hermetically sealing contact with the interior of a through hole of said glove box, said sealing member having an inner diameter equal to or slightly smaller than an outer diameter of said flange portion; and removable clamping members to be located at opposite ends of said flange portion for clamping and affecting a removable hermetic seal between the outer circumferential surface of said flange portion and the inner circumferential surface of said sealing member.

4,686,329

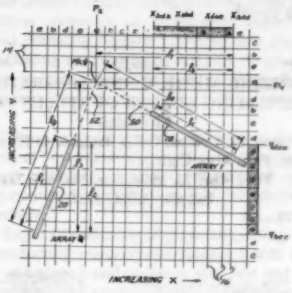
ABSOLUTE POSITION MOUSE

Stephen A. Joyce, Chicago, Ill., assignor to Advanced Robotic Technology, Inc., Chicago, Ill.

Filed Jun. 21, 1985, Ser. No. 747,342

Int. Cl.[4] G08C *21/00*

U.S. Cl. 178—18 **10 Claims**



1. A two-dimensional position location system including a marking means, the marking means being defined over a two-dimensional surface and including a pattern, the pattern comprising an irregular sequence of contiguous spacings, each spacing having a dimension selected from a predetermined set of non-equal dimensions, a cell being defined as a group of a predetermined number of adjacent spacings, the sequence of spacings being arranged whereby any cell within the sequence uniquely locates an associated region of the marking means; pointing means adapted for relative movement adjacent the two-dimensional surface of the marking means, the pointing means including means for identifying marking means cells and means for computing the position of the pointing means on the marking means surface.

4,686,330

TELEPHONE SWITCHING SYSTEM

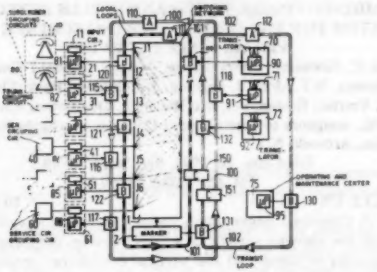
Jean-Jacques Hourton, Paris, France, assignor to Telecommunications Radioelectriques et Telephoniques TRT, Paris, France

Filed Dec. 16, 1983, Ser. No. 562,337

Claims priority, application France, Dec. 22, 1982, 82 21566

Int. Cl.[4] H04Q *3/545, 11/04*

U.S. Cl. 379—269 **9 Claims**



1. A telephone switching system comprising: a plurality of input circuits respectively provided with programmed-logic units; a switching network for switching message information between said input circuits; a plurality of connecting circuits in the form of Pierce loops connecting said input circuits to said switching network, the input circuits being adapted to transmit information for controlling the switching network to the connecting circuits; and a marker circuit connected to the switch-

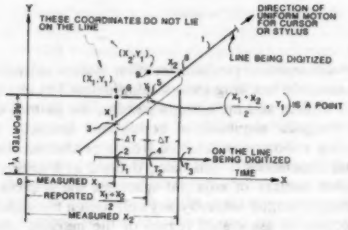
ing network and comprised in at least one of the connecting circuits; the remaining connecting circuits being adapted to further transmit the control information received thereby to said one connecting circuit and said one connecting circuit being adapted to further transmit the control information received thereby to said marker circuit; and said marker circuit being adapted to control the switching network in accordance with the control information transmitted to it by said one connecting circuit.

4,686,331

DIGITIZING METHOD AND APPARATUS FOR COMPENSATING CURSOR OF STYLUS VELOCITY ERRORS

Ken L. Burgess, Ft. Collins, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 23, 1986, Ser. No. 855,221
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—19 **7 Claims**



1. A digitizer of pairs of first and second coordinates, the digitizer comprising:

first means for digitizing at times T and T plus twice delta T respective first and second values of a first coordinate;

second means for digitizing at a time T plus delta T a first value of a second coordinate;

third means, coupled to the first means, for averaging the first and second values of the first coordinate; and

means, coupled to the second and third means, for reporting the coordinate pair comprising the average of the first and second values of the first coordinate paired with the first value of the second coordinate.

4,686,332

COMBINED FINGER TOUCH AND STYLUS DETECTION SYSTEM FOR USE ON THE VIEWING SURFACE OF A VISUAL DISPLAY DEVICE

Evon C. Greanias, Chevy Chase, Md.; C. Richard Guarnieri, Somers, N.Y.; John J. Seeland, Jr., Oakland Park, Fla.; Guy F. Verrier, Reston, Va., and Robert L. Donaldson, Annapolis, Md., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 26, 1986, Ser. No. 878,949
Int. Cl.[4] G08C *21/00*
U.S. Cl. 178—19 **10 Claims**

1. A combined finger touch and stylus detection system for use on the viewing surface of a visual device, comprising:

an array of horizontal and vertical conductors arranged on the viewing surface of the visual display device, having an I/O terminal coupled thereto, for conducting electrical signals between said terminal and the vicinity of said viewing surface;

a radiative pickup stylus, having an output terminal, for receiving electromagnetic signals radiated from said array;

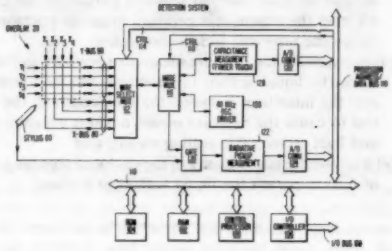
a selection means having a switchable path connected to said I/O terminal of said array and having a control input, for connecting selected patterns of a plurality of said horizontal and vertical conductors to said switchable path in response to control signals applied to said control input;

a capacitance measuring means having an input coupled to said switchable path of said selection means, for measuring the capacitance of selected ones of said conductors in said array, in response to said control signals applied to said control inputs;

a radiative signal source having an output coupled to said switchable path of said selection means, for driving selected ones of said conductors in said array, in response to said control signals applied to said control input;

a radiative signal measuring means coupled to said radiative pickup stylus, for measuring said electromagnetic signals received by said stylus;

a control processor connected to said control input of said selection means, for executing a sequence of stored program instructions to sequentially output said control signals to said selection means;



said control processor connected to said capacitance measuring means, for receiving measured capacitance values of said conductors when said selection means, in response to said control signals, has connected a first pattern of a plurality of said conductors in said array to said capacitance measuring means, to detect the location of a finger touch with respect to said viewing surface of said display device;

said control processor connected to said radiative signal measuring means, for receiving measured radiative signal values when said selection means, in response to said control signals, has connected a second pattern of a plurality of said conductors in said array to said radiative signal source, to detect the location of said stylus with respect to said viewing surface of said display device;

whereby, both finger touch location and stylus location with respect to said viewing surface of said display, can be detected.

4,686,333

ELECTRICAL SWITCH ASSEMBLY AND LATCHING SYSTEM THEREFOR

Norman E. Hoffman, Harrisburg, and Carl D. Oberman, New Cumberland, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 29, 1986, Ser. No. 913,057
Int. Cl.[4] H01H *19/04*
U.S. Cl. 200—6 B **7 Claims**

1. A latching system for an assembly comprising a body means and an outer housing means;

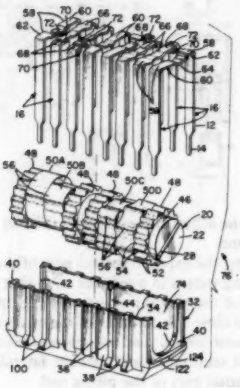
outer housing means including a body section and first wall means extending normally from said body section defining a cavity extending rearwardly from an entrance, said first wall means being resilient and integrally continuous about its periphery at least proximate said entrance;

body means including second wall means and adapted to be axially received in said cavity so that said second wall means extend along inside surfaces of said first wall means;

first latching surface means at a selected axial location along said inside surfaces of a selected at least one of said first

wall means proximate said cavity entrance and facing said body section of said outer housing means;

second latching surface means along a selected at least one of said second wall means facing away from said body section of said outer housing means at a location corresponding to said first latching surface means to latch therewith upon full insertion of said body means, said body means deflecting outwardly said selected at least one of said first wall means of said outer housing means during insertion and said first wall means thus deflected resiling upon latching of said first and second latching surface means; and



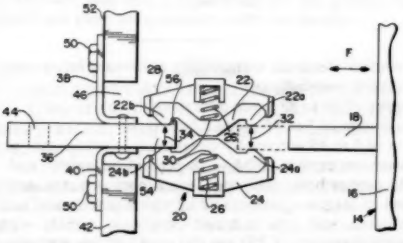
projection means on said body means for permanently deflecting outwardly at least another of said first wall means of said outer housing means upon insertion thereby applying tension to said at least another of said first wall means which is transferred to said selected at least one of said first wall means, by said at least another of said first wall means and said selected at least one of said first wall means being integrally continuous which maintains said selected at least one of said first wall means adjacent said body means and thereby maintains said first and second latching surface means latched.

4,686,334

FRAME WITH CLIP-ON DRAW-IN GRIPS FOR A WITHDRAWABLE MULTIPOLE CIRCUIT BREAKER

Jean-Pierre Nebon, St. Martin-Le-Vinoux, and Alain Gerbert-Gaillard, Tullins, both of France, assignors to Merlin Gerin, Grenoble, France

Filed May 22, 1986, Ser. No. 865,987
Claims priority, application France, Jun. 5, 1985, 85 08597
Int. Cl.[4] H01H *9/20*
U.S. Cl. 200—50 AA **4 Claims**



1. A fixed support frame for a withdrawable multipole circuit-breaker, capable of movement in translation between a first draw-in position and a second extraction position, said frame being shaped as a parallelepipedic housing and defining a front panel and a rear wall, said fixed support frame comprising:

an opening in the front panel enabling the circuit-breaker to be extracted,

an insulating support member arranged on the rear wall opposite the circuit-breaker opening in the front panel;

fixed connection terminals of rectangular shape passing through said insulating support member, each connection terminal including a first connecting part external to the housing for electrical connection to an external busbar, and an opposite second connecting part internal to the housing;

a plurality of draw-in grips mounted upon the second connecting parts of corresponding connection terminals, each draw-in grip including a plurality of pairs of opposing elementary contact fingers operating in conjunction with spring members;

each contact finger of said draw-in grips comprising a bridge made of conducting material and equipped with two opposed first and second end contacts, said first end contact cooperating with the corresponding second connecting part of the fixed connection terminals, and said second end contact cooperating in the draw-in position with a contact terminal of a pole of the withdrawable circuit-breaker;

a single latching edge arranged at an internal end of the second internal connecting part of each fixed connection terminal; and

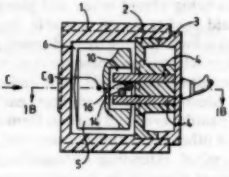
a conjugated notch located upon each draw-in grip and cooperating with said latching edge onto which it clips upon mounting said grip on the fixed connection terminal, so as to form a unilateral gripping, a tilting movement of said grip causing said edge to be automatically unclipped from the notch upon disassembly of said grip.

4,686,335

SHOCK SENSOR SWITCH

John T. Grant, Norwich, England, assignor to Maximal Security Products Ltd., Croydon, United Kingdom

Filed Aug. 12, 1985, Ser. No. 764,884
Int. Cl.[4] H01H *35/14*
U.S. Cl. 200—61.45 R **14 Claims**



1. A vibration sensitive switch comprising:

a switch body;

an electrical contact housed in the switch body for connection in an electrical circuit and defining two contact surfaces;

a mass movably supported with respect to the body at a fulcrum position offset from a center of gravity of the mass, whereby gravity applies a turning moment to the mass about said fulcrum position; and

contact bridging means, coupled to the mass, for bridging between said two contact surfaces, for changing a state of electrical connection of said electrical contact between make and break under the influence of the turning moment of the mass, wherein, when the switch is in its reset position, the contact bridging means is urged against the contact surfaces by a lever action about said fulcrum position as a result of the gravitational force acting on the mass and, when the switch is subject to vibration, the mass

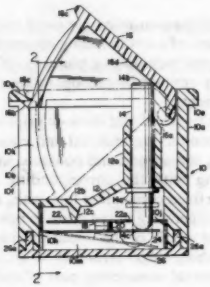
and the switch body undergo relative movement about said fulcrum position to make and break said electrical connection.

4,686,336

APPLIANCE SWITCH

Richard W. Sorenson, Avon, Conn., assignor to Carlingswitch, Inc., West Hartford, Conn.

Filed Nov. 3, 1986, Ser. No. 926,912
Int. Cl.[4] H01H *3/16*
U.S. Cl. 200—61.62 **9 Claims**



1. A switch comprising a generally rectangular one-piece housing having upwardly and downwardly open cavities separated by an internal wall defined integrally in said housing, a plunger slidably received in an opening defined by said internal wall, said plunger having an upper end in said upwardly open cavity and a lower end in said downwardly open cavity, a rocker means pivotably mounting said rocker in said upwardly open cavity said rocker having a downwardly facing abutment surface engaging said plunger upper end, fixed and movable switch contact elements in said downwardly open cavity, said fixed contact element provided above said movable contact element and having an opening for loosely receiving said plunger, and said movable contact element having a cantilevered end portion that is resiliently deformable and that said plunger lower end to bias said plunger upwardly, said switch contact elements being closed when said plunger is in a raised position, and said rocker being movable from a normal up position where it is held in place by said raised plunger position to a down position wherein said plunger is moved downwardly to open said contact elements, said fixed and movable contact elements being identical to one another, each having an L-shape with said cantilevered end portion forming one leg of the L-shape and said other leg defining a terminal adjacent its end portion said terminal extending outwardly of said housing, each of said contact elements including an opening for loosely receiving said plunger as aforesaid.

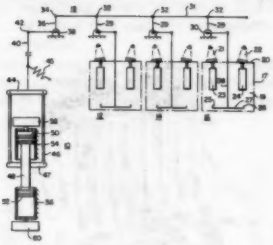
4,686,337

CIRCUIT INTERRUPTER HAVING A CHEMICAL OPERATOR WITH DOUBLE-ACTING DRIVE MEANS

Ronald W. Crookston, Trafford, and Ivan T. Burney, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 1, 1985, Ser. No. 761,452
Int. Cl.[4] H01H *33/42*
U.S. Cl. 200—148 F **5 Claims**

1. An electric circuit interrupter comprising;
a pair of separable contacts,
operating means for opening and closing said contacts,
drive means for actuating the operating means and comprising a pair of open-ended spaced-apart stationary cylinders and a single piston rod that is reciprocally movable and extends into the open ends of said cylinders so that a medial part of said piston rod is disposed in the space between the cylinders and is thereby exposed, said piston rod having a piston at each end that is operatively disposed within the respective stationary cylinders and provided with means that forms a seal with the associated cylinder wall,
generating means for controllably producing and sequentially injecting a pressurized gaseous medium into said cylinders and thereby driving the associated pistons and



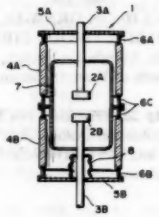
piston rod in a first direction and then in the oppposite direction, and
means coupling the exposed medial part of the piston rod to the operating means in a manner such that the reciprocal movement of the piston rod actuates the operating means to open and close the contacts of the circuit interrupter at predetermined times, said coupling means including a yoke that is secured to and extends laterally beyond the exposed medial part of the piston rod.

4,686,338

CONTACT ELECTRODE MATERIAL FOR VACUUM INTERRUPTER AND METHOD OF MANUFACTURING THE SAME

Yoshiyuki Kashiwagi; Yasushi Noda, and Kaoru Kitakizaki, all of Tokyo, Japan, assignors to Kabushiki Kaisha Meidensha, Japan

Filed Feb. 6, 1985, Ser. No. 698,865
Claims priority, application Japan, Feb. 25, 1984, 59-35025; Feb. 25, 1984, 59-35026
Int. Cl.[4] H01H *1/02. 33/66;* B22F *3/26;* C22C *29/06*
U.S. Cl. 200—264 **7 Claims**



1. A contact electrode material for a vacuum interrupter, which consists essentially of
(a) copper of 20 to 80 percent by weight;
(b) chromium of 5 to 45 percent by weight;
(c) iron of 5 to 45 percent by weight;
(d) chromium carbide of 0.5 to 20 percent by weight; and
(e) said copper being infiltrated into a porous matrix composed of insular agglomerates in which powders of said chromium, said iron and said chromium carbide with particle diameters of 250 μm (60 mesh) or less are mutually bonded to each other, said chromium, iron and chromium carbide being respectively diffused into particles of

said other powders beyond the bonding surface thereof so that the local concentration of said chromium is variable between rich and poor.

4,686,339

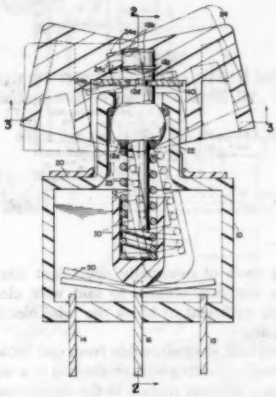
SNAP-ON ACTUATOR FOR TOGGLE SWITCH

Frank P. Sapone, Waterbury, Conn., assignor to Carlingswitch, Inc., West Hartford, Conn.

Filed Feb. 24, 1986, Ser. No. 832,868

Int. Cl.[4] H01H *3/20, 21/02*

U.S. Cl. 200—339 **2 Claims**



1. In combination with an electrical switch of the type having an upstanding bushing with diametrically opposed flats and a movable toggle having a portion projecting upwardly through a top opening defined by an upper end of the bushing, the improvement comprising a one-piece plastic actuator for said switch toggle, said actuator having a downwardly open recess for snugly receiving the projecting portion of said toggle, said actuator also having a larger downwardly open recess having parallel inwardly facing side walls defining guide surfaces for engaging the flats of said upstanding bushing, and a retaining device provided between the upper end of said bushing and an inner end of said larger downwardly open recess, said retaining device being secured in an annular slot provided for this purpose in the projecting portion of the toggle, said retaining device comprising a C-shaped retaining plate of generally rectangular external configuration and having a side opening affording an interference fit with the annular groove in the toggle, said generally rectangular C-shaped retaining plate having opposed end portions that are adapted to be received in grooves provided for this purpose in an actuator portion defining said inner end of said larger recess, said actuator recess having end walls which engage said plate end portions during assembly to provide an interference fit therewith such that said plate end portions snap into the grooves as the actuator and plate are assembled with one another.

4,686,340

INDUCTION HEATING APPARATUS WITH UNSUITABLE LOAD DETECTING CIRCUIT

Minoru Fukasawa, Otsu, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed Apr. 10, 1986, Ser. No. 850,273

Claims priority, application Japan, Apr. 17, 1985, 60-81811; Oct. 18, 1985, 60-160124[U]; Oct. 19, 1985, 60-234311

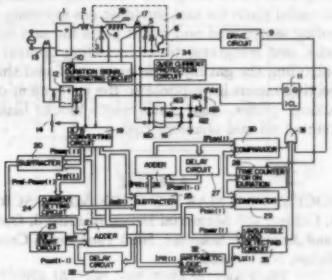
Int. Cl.[4] H05B *6/06*

U.S. Cl. 219—10.77 **11 Claims**

1. An induction heating apparatus provided with an inverter circuit which is supplied with a DC voltage obtained by rectifying an alternating current and includes an induction heating coil and a switching element for causing a resonance current to flow through said induction heating coil, so that said switching element is turned on-off to allow said resonance current to flow through said induction heating coil, thereby heating a load magnetically coupled to said induction heating coil, comprising:

an input power detecting means for detecting a value of said alternating current;

an exciting current detecting means for detecting an exciting current in said inverter circuit;



an unsuitable load detecting means which compares the level of a signal corresponding to said value detected by said input power detecting means and a signal corresponding to said exciting current by said exciting current detecting means so as to thereby determine whether or not said load is suitable;

a rectifying circuit for full-wave-rectifying said exciting current and a bias circuit for biasing a voltage output by said rectifying circuit.

4,686,341

GAS SHIELD CHAMBER FOR ARC WELDING OF RAILS

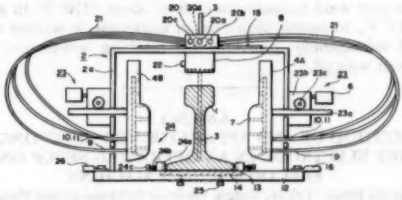
Hirokazu Nomura; Yukihiko Sato; Yasuhiko Nishi, all of Mie; Mizuho Higurashi, Tokyo, and Saburo Mori, Yokohama, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo and Nippon Kokan Koji Kabushiki Kaisha, Yokohama, both of, Japan

Filed Apr. 7, 1986, Ser. No. 848,495

Claims priority, application Japan, Apr. 26, 1985, 60-88712

Int. Cl.[4] B23K *9/16*

U.S. Cl. 219—54 **5 Claims**



1. A gas shield chamber for arc welding of rails comprising:

a chamber casing having an electrically conductive openable back cover placed in contact with bottom surfaces of a pair of rails at a welding joint thereof through a backing material, said chamber casing enclosing said rails at said welding joint when said back cover is closed;

gas injecting means for injecting a shielding gas into said chamber casing;

a pair of side backing plates independently movable toward and away from each other and each having an excess

metal depositing groove adapted for contact with a welding groove on one side of said rail welding joint within said chamber casing;

a pair of drive means including manual-powered operation change-over means and respectively arranged on both sides of said chamber casing on an outer side thereof so as to move said pair of side backing plates independently of each other;

means for fastening said backing material to said back cover;

a pair of ground terminals respectively arranged on both sides of a portion of said back cover contacting with said rail bottom surfaces; and

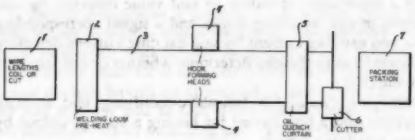
an integrated block integrally including shielding gas inlet and outlet ports for said shielding gas injecting means and cooling water inlet and outlet ports for said side backing plates, said integrated block including control means for controlling the gas injection amount of said shielding gas injecting means in response to the movement of said side backing plates, said integrated block being fixedly mounted on said chamber casing.

4,686,342

PROCESS FOR MAKING WIRE MESH SCREENS

John D. Collier, 185 Memorial Drive, Brantford, Ontario, Canada, and James W. Scheeler, 5050 Tonawanda Creek Rd., N., Pendleton, N.Y. 14120

Filed Aug. 1, 1985, Ser. No. 761,476
Int. Cl.[4] B23K *11/32*
U.S. Cl. 219—58 **6 Claims**



1. A welding process for manufacturing high carbon non-woven steel wire screens which comprises providing a planar array of longitudinal wires containing high carbon steel having a carbon content of at least 0.5%, providing a planar array of similar transverse wires extending transversely of said longitudinal wires, the diameters of said wires being greater than about 0.032 inches, heating at least one junction where said longtudinal and said transverse wires cross to a temperature of from about 700° F. to about 1000° F. for a sufficient period of time to allow heat to disperse to adjacent wire areas but insufficient to cause wire fusion, applying a pulse of electrical current to said junction sufficient to cause fusion or welding of said junction and subsequently heating the resulting welded portion to a post weld temperature of from about 1570° F. to about 1625° F., to permit dispersion of martensite in welded mesh and subsequently quenching the resulting non-woven wire screen with oil.

4,686,343

METHOD OF AND APPARATUS FOR RESETTING A WIRE ELECTRODE IN AN OPERATING SETUP ON AN ELECTROEROSION MACHINE

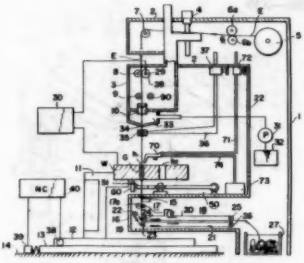
Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Inc, Kanagawaken, Japan

Division of Ser. No. 648,292, Sep. 6, 1984, Pat. No. 4,608,475, which is a continuation of Ser. No. 261,269, May 6, 1981, Pat. No. 4,513,191. This application Feb. 10, 1986, Ser. No. 828,119
Int. Cl.[4] B23P *1/08*
U.S. Cl. 219—69 W **2 Claims**

1. A method of automatically resetting a wire electrode in an operating setup on an electroerosion machine, comprising:

(a) terminating a previous machining operation by shutting off the supply of a machining electrical current to said wire electrode and halting a machining axial advance of said wire electrode extending in a continuous stretch from a supply side to a collection side along a straight path through a workpiece;

(b) breaking said wire electrode in a region adjacent to said workpiece and located at one of the opposite sides thereof by forming said wire electrode in said region with at least two coplanar grooves substantially symmetrical about the axis thereof by advancing symmetrically oppositely into said wire electrode from opposite sides, two symmetrical



grooving tools of essentially equivalent size and shape, and then applying tension to said wire electrode of a magnitude sufficient to break the wire electrode at said grooves; and

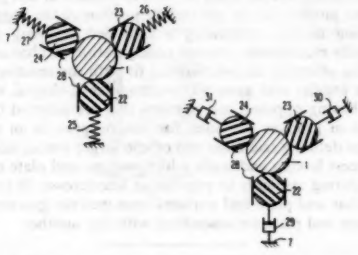
(c) threading said wire electrode from one broken end portion through a starting hole preformed in a workpiece for machining a contour therein in the subsequent machining operation to reestablish the continuous stretch of the wire electrode between said supply side and said collection side.

4,686,344

WIRE GUIDE FOR ELECTRODE DISCHARGE MACHINING

Yoshiro Nakayama, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 15, 1985, Ser. No. 798,493
Claims priority, application Japan, Nov. 16, 1984, 59-240785
Int. Cl.[4] B23H *7/10*
U.S. Cl. 219—69 W **4 Claims**



1. In a discharge machining apparatus including a circular cross-section wire electrode (1) adapted for relative movement with respect to a workpiece (3), contact means (4) engaging the electrode for supplying electrical power thereto, and a pair of upper and lower guide devices individually disposed above and below the workpiece in contact with the electrode, the improvement characterized by at least one of the guide devices comprising:

(a) a centrally apertured frame member (7) surrounding the electrode,

(b) at least three equally circumferentially spaced guide members disposed within the frame member and in indi-

vidual contact with the electrode at three corresponding equally circumferentially spaced points, and

(c) means supported by the frame member and individually coupled to the guide members for applying equal, radially inwardly directed forces to the electrode at said spaced guide member contact points to thereby resist any lateral displacements of the electrode and maintain the electrode in a centered position to implement accurate machining,

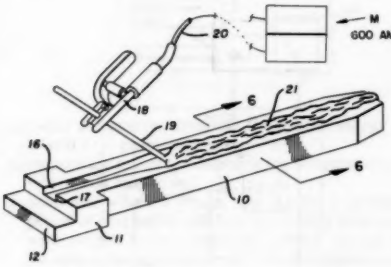
(d) wherein the guide members are ball elements (22, 23, 24) individually disposed in guideways (28) for constraining them to radial movement relative to the electrode, and the force applying means comprises fluid cylinders (29, 30, 31) individually coupled between the ball elements and the frame member.

4,686,345

METHOD OF REBUILDING A STRIP MILL GUIDE

Grant A. Oakes, 3605 Warren Meadville Rd., Cortland, Ohio 44410

Filed Jun. 10, 1985, Ser. No. 743,307
Int. Cl.[4] B23K *9/04*
U.S. Cl. 219—76.14 **6 Claims**



1. The method of rebuilding a strip mill guide formed principally of copper and having lead therein, and having more than one longitudinally extending irregularly shaped groove therein forming at least one longitudinally extending channel in at least one location longitudinally of said strip mill guide comprising steps of preheating said strip mill guide, providing a welding rod formed principally of copper and having a diameter of one quarter inch, positioning the welding rod in an electrode holder capable of conducting at least 800 ampere arc welding electric current to said welding rod, establishing conductors between said electrode holder and a source of at least 600 ampere arc welding electric current and said strip mill guide, energizing said source of arc welding current so as to deliver between 600 and 800 amperes arc welding electric current to said welding rod and moving said welding rod along said grooves and channel in said strip mill guide so as to maintain an electric arc whereby said strip mill guide is heated and said welding rod is melted and deposited in said grooves and channel.

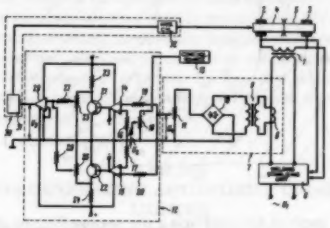
4,686,346

CONTROL DEVICE FOR FLASH-BUTT RESISTANCE WELDING MACHINE

Sergei I. Kuchuk-Yatsenko; Valery G. Krivenko; Alexei I. Gorishnyakov; Mikhail V. Bogorsky, and Ivan L. Lazebny, all of Kiev, U.S.S.R., assignors to Institute Elektrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR, Kiev, U.S.S.R.

PCT No. PCT/SU84/00028, § 371 Date Dec. 30, 1985, § 102(e) Date Dec. 30, 1985, PCT Pub. No. WO85/05305, PCT Pub. Date Dec. 5, 1985
PCT Filed May 18, 1984, Ser. No. 824,012
Int. Cl.[4] B23K *11/04*
U.S. Cl. 219—110 **8 Claims**

1. In a control device for a flash-butt resistance welding machine including a welding transformer having a primary winding and a secondary winding, a machine movable plate, an electrohydraulic drive for the machine movable plate, a drive control unit, and a welding process electric parameter pickup means in series with the primary winding of said welding transformer and electrically connected to the electrohydraulic drive of the machine movable plate via the drive control unit, the improvement comprising the drive control unit including two amplifiers each having first and second inputs and an output, the first inputs of said two amplifiers being connected



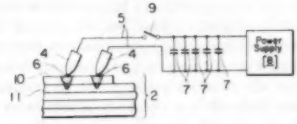
to the welding process electrical parameter pickup means, a control voltage source, the second inputs of said two amplifiers being connected to the control voltage source, an operational amplifier having two inputs and an output with its output connected to the electrohydraulic drive, a transistor and voltage divider means connecting the outputs of said two amplifiers to an input of the operational amplifier, and a welding voltage stabilizing means for interconnecting the primary winding of the welding transformer to a power supply, said welding voltage stabilizing means having a control input means connected to the secondary winding of the welding transformer.

4,686,347

METHOD FOR WELDING AMORPHOUS WOUND CORES

Shunsuke Arakawa, and Kunio Shitori, both of Saitama, Japan, assignors to Hitachi Metals, Ltd., Osaka, Japan

Filed Feb. 5, 1985, Ser. No. 698,390
Claims priority, application Japan, Feb. 15, 1984, 59-26641
Int. Cl.[4] B23K *11/16*
U.S. Cl. 219—117.1 **4 Claims**



1. A method for welding an end portion of a wound magnetic amorphous metal ribbon in order to produce a wound magnetic core comprising the steps of:

(a) bringing a pair of electrodes into contact with an outer surface of an outer end portion of said amorphous ribbon; and

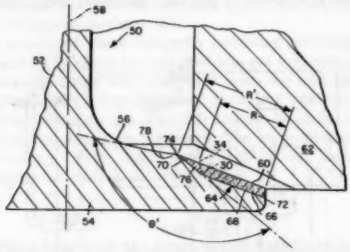
(b) supplying an electric pulse having an energy level of 0.5 to 100 joules between said pair of electrodes to instantaneously melt said outer end portion and an underlying ribbon layer for welding them together without causing deterioration in the magnetic characteristics of said wound core.

4,686,348

METHOD FOR HARDFACING VALVES

Kent I. Johns, North Vernon, and Clinton J. Wohlmuth, Columbus, both of Ind., assignors to Cummins Engine Company, Inc., Columbus, Ind.

Division of Ser. No. 456,585, Jan. 7, 1983, Pat. No. 4,529,169.
This application Apr. 2, 1985, Ser. No. 719,138
Int. Cl.[4] B23K *9/00*
U.S. Cl. 219—121 PY 6 Claims



1. In a method for hardfacing the seating face of the valve head of a poppet-type valve for forming an annular seating area thereon extending from a first radial location between the valve stem and the outer periphery of the valve head, to a second radial location, spaced radially outwardly of the first radial location toward the outer periphery, including the steps of forming a circumferential groove in said seating face and depositing hardfacing material at high temperatures in said groove, the improvement which comprises

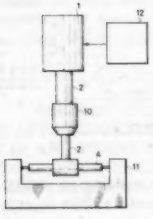
forming said groove in such a manner that its inner radial limit at the seating face is radially inwardly of said first radial location a sufficient distance that high temperature deposition of hardfacing material within said groove will not cause substantialy dilution by valve head material of the composition of the hardfacing material within said annular seating area.

4,686,349

APPARATUS FOR IMPROVING SURFACE QUALITY OF ROTARY MACHINE PARTS

Akinobu Kawazu; Atsushi Fukada, and Susumu Hoshinouchi, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 21, 1985, Ser. No. 747,606
Claims priority, application Japan, Jun. 22, 1984, 59-127295
Int. Cl.[4] B23K *26/00*
U.S. Cl. 219—121 L 3 Claims



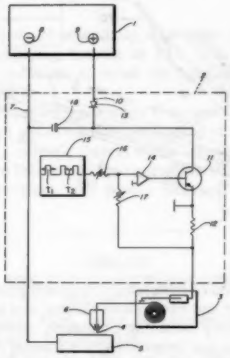
1. In an apparatus for improving the surface quality of a rotary machine part comprising means for positioning a rotary machine part for rotation about an axis, means for rotating said part at a constant angular velocity, means for irradiating a surface of the rotary machine part with a high density beam to obtain a rapidly solidified layer and a transformation-hardened layer, and means for condensing said high density beam, and means for controlling the intensity of said beam, the improvement wherein; said condensing means comprises means for condensing said high density beam for effecting a spatial intensity distribution thereof of parallelpiped shape and for collimating said high density beam to a rectangular form in cross section and for causing the density of said beam to be uniform, and wherein said means for controlling the intensity of said beam comprises means for controlling the height of the parallelpiped spatial intensity distribution of said beam such that the surface of said rotary part melts and rapidly solidifies, whereby the surface quality of the rotary machine part is improved with the rapidly solidified layer and transformation-hardened layer of said surface portion being uniform without pitting and/or cracking.

4,686,350

MIG/MAG WELDING MACHINE FOR PULSED ARC WELDING

Peter Bodewig, Ratingen, Fed. Rep. of Germany, assignor to M. K. Products, Inc., Irvine, Calif.

Filed Jul. 16, 1986, Ser. No. 886,216
Claims priority, application Fed. Rep. of Germany, Jul. 20, 1985, 3526054; Sep. 25, 1985, 3534061
Int. Cl.[4] B23K *9/09*
U.S. Cl. 219—130.51 6 Claims



1. In a MIG/MAG welding machine for pulsed arc welding wherein a predetermined current is maintained between a work piece and a welding electrode to provide an arc therebetween, a welding circuit comprising:

a constant voltage source,

transistor means having a base, a collector connected to the constant voltage source, and an emitter connected to the welding electrode through a circuit including a resistor,

a pulse generator connected to the base of the transistor means through a circuit including amplifier means, said amplifier means having an output connected to the base of the transistor means and an input connected to the pulse generator and the resistor.

4,686,351

THERMAL DEVELOPING APPARATUS

Kenji Nakauchi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 16, 1985, Ser. No. 808,980
Claims priority, application Japan, Jan. 7, 1985, 60-000697
Int. Cl.[4] H05B *1/02*
U.S. Cl. 219—216 20 Claims

10. A thermal developing apparatus which thermally develops a thermally developable photosensitive material having an electrically conductive, heat-generating layer, comprising:

a casing having a vent hole;

a transporting device having a plurality of pairs of electrically conductive rollers and press rollers, said electrically

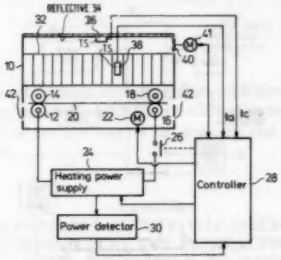
conductive rollers being brought into contact with said heat-generating layer, and said transporting device being housed within said casing such that said photosensitive material is clamped between said pairs of electrically conductive rollers and press rollers so as to be transported;

a heat-reflecting plate mounted on an inner wall of said casing so as to oppose said photosensitive material when loaded into said casing by said transporting device;

a fan for ventilating air within said casing;

a power supply for supplying electric energy to said heat-generating layer through said electrically conductive rollers;

a switch disposed between said electrically conductive rollers and said power supply;



a power detector for detecting the electric energy supplied to said heat-generating layer;

a temperature sensor for detecting the temperature of the air within said casing; and

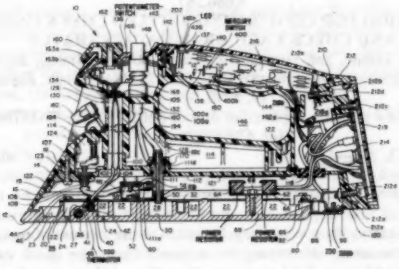
a controller which activates said fan for a predetermined period of time before said heat-generating layer is supplied with electric power, calculates electric energy required for raising the temperature of said photosensitive material from a temperature corresponding to said air temperature measured after said fan has been started to a predetermined temperature suitable for development, turns ON said switch for the period of time required for obtaining said calculated electric energy, and controls said power supply so that the electric energy required for obtaining said calculated electric energy is supplied on the basis of the output of said power detector.

4,686,352

ELECTRONIC PRESSING IRON

Thomas L. Nawrot, Glen Ellyn; John Vancha, Bolingbrook, and James C. Mysicka, Berwyn, all of Ill., assignors to John Zink Company, Tulsa, Okla.

Filed Apr. 27, 1984, Ser. No. 605,442
Int. Cl.[4] H05B *1/02*; D06F *75/26*; G08B *21/00*
U.S. Cl. 219—250 **23 Claims**



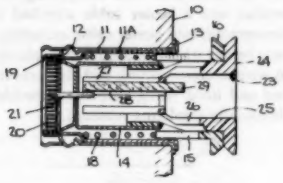
1. A pressing iron comprising: a housing; a soleplate connected to said housing; an electric heating element mounted in good heat conducting relationship with said soleplate; means for controlling an electric current connected to said electric heating element and being adapted to receive an electric current from a suitable source of electric current and to selectively supply said electric current to said electric heating element; and first sensing means for responding to the orientation and motion of said soleplate, said first sensing means being connected to said means for controlling said electric current to supply said electric current to said electric heating element in response to detection by said first means of soleplate motion with said soleplate oriented horizontally indictaive of iron use and to interrupt said electric current to said electric heating element in response to detection by said first means of lack of motion of the soleplate for a predetermined period of time with said soleplate oriented horizontally indicative of iron non-use and to interrupt said electric current to said electric heating element in response to detection by said first means of said soleplate being oriented substantially upright and motionless in a storage position.

4,686,353

AROMA-GENERATING AUTOMOBILE CIGARETTE LIGHTER

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Continuation-in-part of Ser. No. 658,778, Oct. 9, 1984, Pat. No. 4,574,181. This application Mar. 3, 1986, Ser. No. 835,223
Int. Cl.[4] F23Q *7/00*; A61L *9/03*
U.S. Cl. 219—275 **5 Claims**



1. A cigarette lighter adapted to function also as an aroma generator, the lighter being insertable into a socket having terminals which are connected to a power source, one of which is a latching bi-metallic element, said lighter comprising:

A. a case that fits into the socket;

B. a spring-biased hollow plunger formed from a cylindrical metal shell having a vented cylindrical cage projecting from its open rear end and terminating in a ring serving as the plunger knob;

C. an electrical heater unit attached to the front end of the shell and which in the inactive state of the plunger lies within the case, the unit having contacts, whereby when a user presses in the plunger, the contacts are engaged by the socket terminals to energize the unit and the unit is then latched by the latching element, the resultant heat being transferred to the interior of the shell and also acting to deform the latching element, thereby disengaging the terminals and causing the released plunger to return to its inactive state; and

D. a removable vented cartridge insertable into the plunger and having therein a heat-responsive, aroma-generating element that is activated by the interior heat to exude an aromatic vapor, said heater unit being formed by a cup-shaped bezel and a spiral strip of electrical resistance material nested in the bezel, one end of the strip being connected to the bezel which is engaged by the latching terminal, the other end of the strip being connected to a center electrode that is engaged by the other terminal, said center electrode having a metal rod attached thereto which extends into the interior of the metal shell to a point adjacent said aroma-generating element to transfer heat

from the heater unit to the element and thereby promote the generation of the aroma.

4,686,354

INHALATION APPARATUS

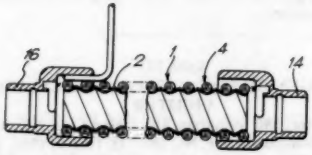
Ronald P. Makin, Skipton, United Kingdom, assignor to The BOC Group plc, Windlesham, England

Filed Mar. 31, 1986, Ser. No. 846,437

Claims priority, application United Kingdom, Apr. 4, 1985, 8508921

Int. Cl.[4] A61M *16/16*

U.S. Cl. 219—301 **1 Claim**



1. A composite, flexible delivery hose for use with a medical humidifier and having temperature sensors arranged one at each end of the hose, said hose comprising an inner flexible tubular member and a heater cable attached to and wound spirally therearound, said heater cable including a first electrical resistance heater wire, a second thermoplastic support wire and a third wire interconnecting said temperature sensors, said first, second and third wires all being imbedded in an outer body of electrically insulating material.

4,686,355

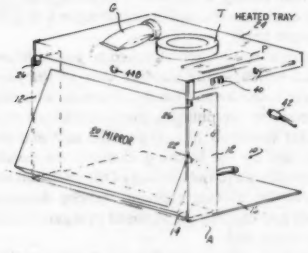
OSTOMY APPLICATION DEVICE

Larry D. Lay, 26078 Alger, Madison Heights, Mich. 48071

Filed Jan. 28, 1986, Ser. No. 823,198

Int. Cl.[4] H05B *3/22*

U.S. Cl. 219—385 **4 Claims**



1. Apparatus for assisting in the application of an ostomy pad comprising a frame having a pair of upright frame members, a mirror mounted between said frame members for pivotal movement about an longitudinal axis, a tray-like heater, and means mounting said heater upon the upper ends of said frame members for pivotal movement between a collapsed, vertically disposed position between the frame members and an operative position wherein said heater is stably supported in a horizontal position adjacent the upper ends of said frame members and above the mirror.

4,686,356

HEATING APPLIANCE WITH INTERNAL NON-VOLATILE MEMORY

Shigeki Ueda; Toyotsugu Hatagawa, and Isao Kasai, all of Yamatokoriyama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

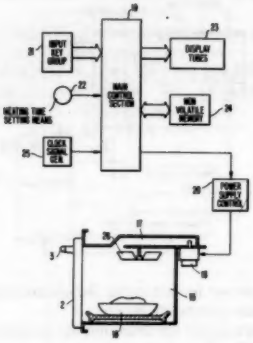
PCT No. PCT/JP83/00111, § 371 Date Dec. 20, 1983, § 102(e) Date Dec. 20, 1983, PCT Pub. No. WO83/03888, PCT Pub. Date Nov. 10, 1983

Continuation of Ser. No. 567,844, Dec. 20, 1983, abandoned. This PCT application Apr. 13, 1983, Ser. No. 827,660

Claims priority, application Japan, May 4, 1982, 57-74908

Int. Cl.[4] H05B *6/68*

U.S. Cl. 219—482 **12 Claims**



1. A heating appliance comprising a heating chamber for accepting a heating load, a heat source coupled to said heating chamber, a control section for controlling the feeding of energy to said heat source, a MNOS memory, a memory writing means for instructing the writing of heating data including heating time, heat output and/or heating temperature into said MNOS memory through an operation panel by an operator, and a memory reading means for instructing the readout of the heating data from said MNOS memory, the control section reads out the heating data from MNOS memory and rewrites the same data for confirming the stored data when the control section detects a turn on of a power source; wherein said MNOS memory operates as a non-volatile memory and wherein addressed data to be refreshed is stored at a certain address in said MNOS memory and only the heating data stored at the address corresponding to said certain address data to be refreshed is rewritten every time that a power source is turned on or when a predetermined time has passed, while the address data to be refreshed is up-dated.

4,686,357

METHOD FOR CONFIRMING SETTLED CHECK CARDS AND CHECK CARD DRAWING APPARATUS

Shugo Douno, and Hiroshi Tomiyama, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan

Filed Jun. 19, 1985, Ser. No. 746,982

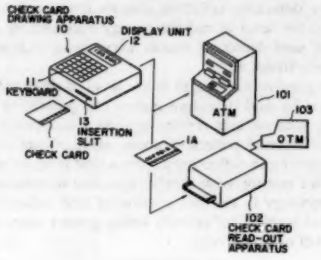
Claims priority, application Japan, Jul. 27, 1984, 59-157065

Int. Cl.[4] G06K *5/00*

U.S. Cl. 235—379 **15 Claims**

1. In a check card negotiating system for crediting a sum of money to a designated account or cashing the same by the steps of inserting a check card into a check card drawing apparatus to input necessary data such as the amount of money for processing, identifying the authenticity of the check card and drawing a check and, inserting the card of said drawn check into a check card insertion slit interconnected to note/coin processor such as an automatic cash dispensing machine, automatic cash depositing/dispensing machine or teller's ma-

chine to judge its authenticity, a method for collating settled check cards which is characterized in that data for drawing of a check card are stored in the check card drawing apparatus at the time of drawing so that when the check card is inserted into



the check card drawing apparatus after settlement and its data are read out, the check card may be marked as void depending on whether or not the data on the drawing and the data read out coincide.

4,686,358

PROGRAMMABLE ELECTRONIC-MECHANICAL REVERSING FLAT KEY INTERACTIVELY COMMUNICATABLE WITH DATA PROCESSING MEANS

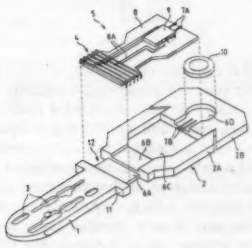
Erich Seckinger, Wallisellen, and Walter Gutmann, Wetzikon, both of Switzerland, assignors to Bauer Kaba AG, Wetzikon, Switzerland

Filed Mar. 15, 1985, Ser. No. 712,136

Claims priority, application Switzerland, Mar. 15, 1984, 1304/84

Int. Cl.[4] G06K *19/06*

U.S. Cl. 235—382 **12 Claims**



1. A mechanical and electronic flat key for use in combination with a lock of the type having a rotor, a key slot, means for performing a mechanical locking/unlocking function and an electronic locking/unlocking function and electrical conductors extending between and interconnecting said slot and said means for performing said electronic locking/unlocking function, the key comprising the combination of

a key shank dimensioned to be insertable into the lock rotor key slot for driving said rotor;

a key grip;

an intermediate portion fixedly attached to and mechanically interconnecting said shank and said grip on opposite sides of side intermediate portion;

means on said shank defining mechanical coding for cooperating with said means in said rotor for performing said mechanical locking/unlocking function of said lock;

an electronic coding circuit for cooperating with said means in said rotor to perform said electronic locking/unlocking function of said lock;

means defining a recess in said grip for receiving said electronic coding circuit;

circuit means electrically connected to said coding circuit having contact members for making electrical contact with conductors in said rotor to permit transmission of electrical signals between said coding circuit and said means in said rotor controlling said electronic locking/unlocking function; and

means defining a recess in said intermediate portion for receiving said circuit means with said coding circuit in said grip recess and for holding said contact members in proper position to engage said electrical conductors in said rotor when said key is in said slot.

4,686,359

PICTURE SCANNING AND RECORDING USING A PHOTOELECTRIC FOCUSING SYSTEM

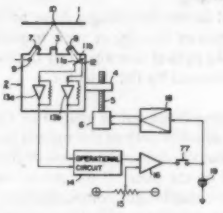
Masakatsu Yokoi, Kyoto, and Tsutomu Harada, Shiga, both of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

Filed Jan. 2, 1985, Ser. No. 688,457

Claims priority, application Japan, Jan. 10, 1984, 59-1258

Int. Cl.[4] G01J *1/20*; H04N *1/028*

U.S. Cl. 250—201 **1 Claim**



1. A system for maintaining a scanning head in a focused position on the surface of an original picture film applied to an original picture drum wherein picture signals are obtained by photoelectrically scanning said original picture film with said scanning head moving in the axial direction of said original picture drum, said system comprising:

(a) pickup means mounted on said scanning head for scanning said original picture film;

(b) light projection means, having a light projection lens and a light point source at the rear of said light projection lens, disposed on one side of said pickup means for focusing a light point on the surface of said original picture film, said light projection means having an optical axis thereof intersecting, on said original picture film, with an optical axis of a light receiving means;

(c) light receiving means disposed on the other side of said pickup means for producing an image of said light point, and comprising a light receiving lens and a light sensor composed of a plurality of divided regions;

(d) operational means for calculating an output signal from said divided regions;

(e) comparing means for comparing the output signal from said operational means with a reference signal and producing a signal representing a difference therebetween; and

(f) displacing means for minutely displacing said scanning head in a direction at right angles with the axial direction of said original picture drum until said signal representing a difference is zero.

4,686,360

DEVICE FOR THE AUTOMATIC FOCUSSING OF OPTICAL INSTRUMENTS WITH COMPLEMENTARY MEASURING AND DETECTING DIAPHRAGMS

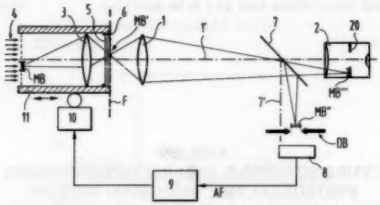
Georg Gorgon, Puchheim, Fed. Rep. of Germany, assignor to Karl Süss KG, Präzisionsgeräte für Wissenschaft und Industrie GmbH & Co., Garching, Fed. Rep. of Germany

Filed Oct. 31, 1984, Ser. No. 666,986

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1983, 3339970

Int. Cl.[4] G01J *1/20*

U.S. Cl. 250—201 **26 Claims**



1. A device for the automatic focussing of optical instruments with an eyepiece, comprising

(a) a measuring beam, which can be brought into the radiation path of the optical instrument, for illuminating the surface of an object,

(b) a detector for determining the focussing accuracy of the optical instrument with respect to the surface of the object and comprising

(c) a control device including a drive for adjusting the relative position of the object with respect to the focussing plane of the optical instrument by optimising an autofocus signal generated by the detector,

wherein

(d) a measuring diaphagm is imaged by the measuring beam into the radiation path of the optical instrument in such a manner that the nominal position of the diaphragm image is located on the plane of the object when focussed and

(e) a detector diaphragm complementary to the measuring diaphragm and arranged in front of the detector is on the image plane, or an optical equivalent, of the optical instrument, the detector providing an output autofocus signal to the control device to move the drive for focussing movement between the object/measuring diaphragm and the optical instrument.

4,686,361

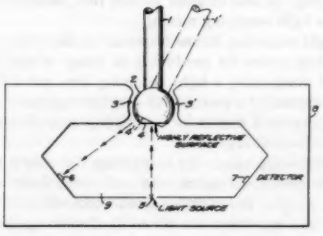
JOYSTICK CONTROL UNIT

Arnold D. Bard, 1049 Stratton Pl., Elberon, N.J. 07740

Continuation-in-part of Ser. No. 459,772, Mar. 8, 1983, abandoned. This application Jul. 22, 1985, Ser. No. 757,204

Int. Cl.[4] G01B *11/26;* **G01D** *5/30*

U.S. Cl. 250—221 **8 Claims**



1. A joystick control unit comprising,

means for manually tilting a reflective surface through an X-Y plane,

means mounted beneath said reflective surface for generating radiant energy, said reflective surface operating to reflect energy from said radiant energy generating means,

means for detecting reflected energy from said reflective surface, the level of radiant energy received by selected ones of said detecting means varying as said reflective surface is tilted, and

means responsive to changes in the level of reflected energy received by said detecting means for generating control signals, wherein said reflective surface comprises at least first and second reflective areas, each of said reflective areas varying in reflectivity from a first level of reflectivity in one portion of said reflective area to a second level of reflectivity in another portion of said reflective area, said first level of reflectivity being greater than said second level of reflectivity.

4,686,362

INCREMENTAL OPTICAL ENCODER WITH A TUNED VERNIER

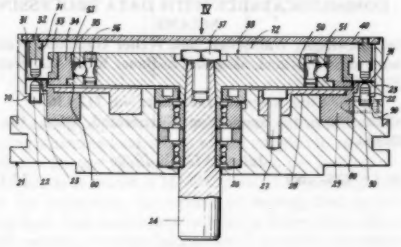
Michele Merlo, Via Monterosa, 61, 20100 Milan, Italy

Filed Apr. 3, 1986, Ser. No. 847,474

Claims priority, application Italy, Apr. 26, 1985, 20510 A/85

Int. Cl.[4] G01D *5/34*

U.S. Cl. 250—231 SE **6 Claims**



1. An incremental encoder comprising: a rotor associated with a shaft and peripherally possessing a circular succession of windows and at least one pair of units for reading the passage of the windows, each unit comprising a light emitting diode, a screen provided with windows corresponding to the rotor windows, and a light-sensitive semiconductor producing an output signal, characterised in that the rotor comprises a peripheral annular member which carries the circular succession of windows, on said annular member there acting thrust means which can be adjusted so as to correct the off-centering between the circular succession of windows and the shaft, and the non-uniform distribution of said windows.

4,686,363

SELF-RESONANT SCANNER BIASING SYSTEM

David J. Schoon, St. Paul, Minn., assignor to Printware, Inc., Mendota Heights, Minn.

Filed Jan. 21, 1986, Ser. No. 820,231

Int. Cl.[4] H04N *3/08*

U.S. Cl. 250—235 **10 Claims**

1. A circuit apparatus for controlling drive to a self-resonant scanner of a light beam, said apparatus comprising:

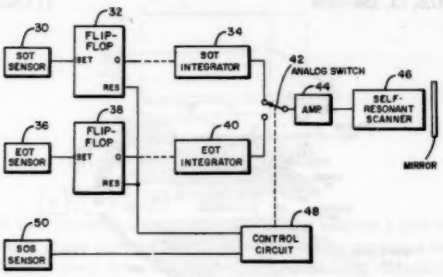
a Start-of-Trace sensor for detecting all times that a light beam which is repetitively, time-after-time, tracing an oscillatory course responsive to a self-resonant scanner of said light beam, does traverse so far in a first direction of excursion so as to impinge upon a first, start-of-trace, fixed point along said first direction of excursion;

an End-of-Trace sensor for detecting all times that said light beam which is repetitively, time-after-time, tracing said

oscillatory course responsive to said self-resonant scanner of said light beam, does traverse so far in a second direction of excursion, opposite to said first direction of excursion, so as to impinge upon a second, end-of-trace, fixed point along said second direction of excursion;

Start-of-Trace accumulating means responsive to said detecting of said Start-of-Trace sensor for producing a first voltage level proportional to the numbers of times said light beam did traverse so far in said first direction of excursion so as to be detected by said Start-of-Trace sensor to impinge upon said first, start-of-trace, fixed point;

End-of-Trace accumulating means responsive to said End-of-Trace sensor for producing a second voltage level proportional to the numbers of times said light beam did traverse so far in said second direction of excursion so as



to be detected by said End-of-Trace sensor to impinge upon said second, end-of-trace, fixed point;

driver means responsive to a received signal for providing drive to said self-resonant scanner of said light beam; and

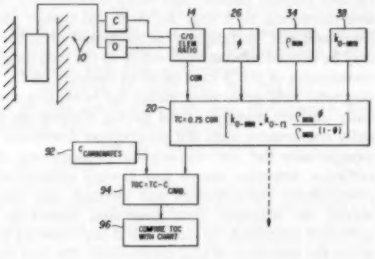
coupling means for coupling during a first one-half of each oscillatory cycle said first voltage level received of said Start-of-Trace accumulating means to said drive means at a polarity which will cause said driver means to provide a drive inducing said self-resonant scanner of a light beam to continue in oscillation, and for coupling during a second one-half of each oscillatory cycle said second voltage level received of said End-of-Trace accumulating means to said drive means at a polarity which will cause said drive means to provide a drive inducing said self-resonant scanner of a light beam to continue in oscillation.

4,686,364

IN SITU DETERMINATION OF TOTAL CARBON AND EVALUATION OF SOURCE ROCK THEREFROM

Susan L. Herron, Danbury, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed Jul. 19, 1985, Ser. No. 756,613
Int. Cl.[4] G01V *5/00*
U.S. Cl. 250—256 **20 Claims**



1. A method for determining in situ the carbon content of a formation traversed by a borehole, comprising:

(a) measuring the carbon/oxygen elemental ratio of said formation;

(b) determining the porosity of the formation;

(c) obtaining the oxygen content and density of the fluid in said formation;

(d) obtaining the oxygen content and density of the minerals in said formation;

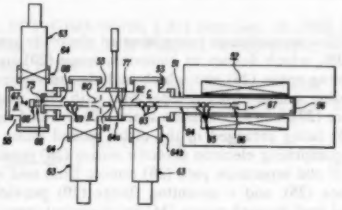
(e) determining the total carbon content of said formation from said carbon/oxygen ratio, said oxygen content and density of the fluid in said formation, and said oxygen content and density of the minerals in said formation.

4,686,365

FOURIER TRANSFORM ION CYCLOTHON RESONANCE MASS SPECTROMETER WITH SPATIALLY SEPARATED SOURCES AND DETECTOR

John T. Meek, Mercer County, N.J., and Gerald W. Stockton, Bucks County, Pa., assignors to American Cyanamid Company, Stamford, Conn.

Filed Dec. 24, 1984, Ser. No. 685,811
Int. Cl.[4] B01D *59/44*
U.S. Cl. 250—281 **29 Claims**



1. A Fourier transform ion cyclotron resonance mass spectrometer, for measuring accurate masses of positively and negatively ionized molecules from a vaporized chemical sample comprising:

(a) a vacuum housing divided into first, second and third differentially-pumped vacuum regions, separated by apertures, in order of decreasing internal pressure;

(b) means to introduce, vaporize, and ionize chemical materials in said first region of said vacuum housing;

(c) means for the extraction of ions from said means to introduce, vaporize and ionize, and for transporting said ions from said first region to said second region of said vacuum housing;

(d) means to produce a strong, homogeneous magnetic field having a principal axis lying within said third region of said vacuum housing and having an inhomogeneous fringing region extending into said second region;

(e) an electrostatic element cylinder lens to focus, accelerate and guide the ions along said principal axis of said magnetic field, in the inhomogeneous fringing region of the field, and through the aperture separating said second and third regions of said vacuum housing;

(f) means to decelerate the ions to near-thermal velocity in a homogeneous part of said magnetic field;

(g) an ion cyclotron resonance mass analyzer cell means to trap the ions in a confined volume of space, situated in the third region of said housing, in the homogeneous part of said strong magnetic field;

(h) means to introduce a pulsed reagent gas into said cell means to induce reactive collisions;

(i) means for providing an oscillating electic field to accelerate the trapped ions into larger orbital radii, for creating observable coherent motions of the ions; and

(j) means to render observable the characteristic frequencies of the orbital motions of the trapped ions, such that ionic masses can be calculated.

4,686,366

LASER MASS SPECTROMETER

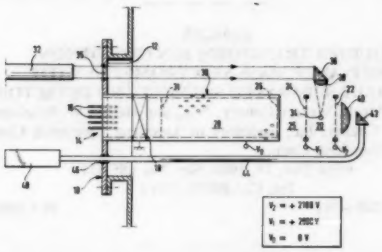
Michael Stuke, Goettingen, Fed. Rep. of Germany, assignor to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Fed. Rep. of Germany

Filed Nov. 21, 1985, Ser. No. 800,546

Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3517667

Int. Cl.[4] B01D *59/44*

U.S. Cl. 250—287 16 Claims



1. A mass spectrometer comprising an electrode system (22, 24, 26, 30), which defines an ionization space (20) and an ion accelerating space (25) and which includes an electrode (30) surrounding a time-of-flight separation path (28), said ionization space (20), said acceleration space (25) and said separation path (28) being arranged in the order named along an axis; further comprising electron detector means (18) positioned at an end of said separation path (28) remote from said accelaration space (25); and a mounting flange (10) provided with electrical lead-through means (16) for electrical connection of the electrodes of the electrode system and of the ion detector means, characterized in that at least said electrode (30) which surrounds said separation path (28) is mounted in an easily removable manner on support members (66) extending in axial direction along said electrode system.

4,686,367

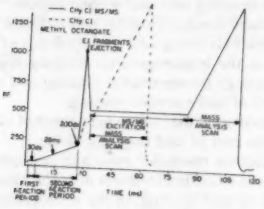
METHOD OF OPERATING QUADRUPOLE ION TRAP CHEMICAL IONIZATION MASS SPECTROMETRY

John N. Louris, West Lafayette, Ind.; John E. P. Syka, Sunnyvale, and Paul E. Kelley, San Jose, both of Calif., assignors to Finnigan Corporation, San Jose, Calif.

Filed Sep. 6, 1985, Ser. No. 773,339

Int. Cl.[4] H01J *49/42*

U.S. Cl. 250—290 5 Claims



1. The method of mass analyzing a sample (analyte) in a quadrupole ion trap in a chemical ionization (CI) mode which comprises the steps of introducing analyte and reagent molecules into the ion trap having a three dimensional quadrupole field in which low mass ions are stored, ionizing the mixture whereby low mass reagent ions and low mass analyte ions are trapped, changing the three dimensional field while allowing the reagent ions and analytic molecules to react to form product ions and trap higher mass product ions, scanning the three dimensional field to successively eject the product ions and detecting the product ions.

4,686,368

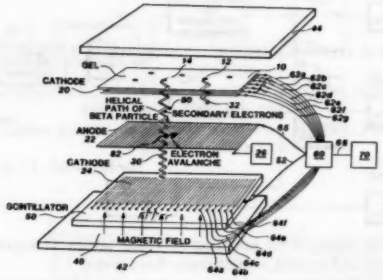
APPARATUS AND METHOD FOR READING TWO-DIMENSIONAL ELECTROPHORETOGRAMS CONTAINING β-RAY-EMITTING LABELED COMPOUNDS

Herbert L. Anderson, Santa Fe; W. Wayne Kinnison, and John W. Lillberg, both of Los Alamos, all of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 30, 1985, Ser. No. 728,965

Int. Cl.[4] G01T *1/00*

U.S. Cl. 250—374 11 Claims



1. An apparatus for reading flat, substantially planar two-dimensional gel electrophoretograms containing β-ray-emitting labeled compounds, said apparatus comprising in combination:

a. a single, substantially flat and rectangular proportional chamber radiation detection means substantially parallel to and approximately coextensive with the gel electrophoretogram for receiving β-rays emitted from the electrophoretogram and cosmic rays and generating electrical signals according to the two dimensional coordinates of each β-ray and cosmic ray received thereby, said substantially flat and rectangular proportional chamber radiation detector means being located in close proximity to the gel surface and containing a β-radiation detection gas;

b. substantially flat and rectangular scintillator means located nearby to said substantially flat and rectangular proportional chamber radiation detection means for detecting the incidence of cosmic rays on said substantially flat and rectangular proportional chamber radiation detection means and having an electrical output in response thereto, yet having substantially no sensitivity to the β-rays emitted from the gel, said substantially flat and rectangular scintillator means being disposed in a substantially parallel manner thereto and being substantially coextensive therewith, such that the electrical signals generated from said flat, rectangular proportional chamber means may be related substantially solely to the two dimensional coordinates of the β-rays incident thereon; and

c. magnetic field generating means for providing a substantially uniform magnetic field having dimensions substantially coextensive with the rectangular dimension of said substantially flat and rectangular proportional chamber radiation detection means and passing substantially perpendicularly therethrough and through said scintillator means, the magnetic field generated therefrom having sufficient magnitude to cause the β-rays emitted from the gel in the direction of said substantially flat and rectangular proportional chamber means to move in an increasingly tight helical path therein as the emitted β-rays are slowed by collisions with the β-radiation detection gas, so

as to substantially retin the two dimensional coordinate information of their origin within the gel.

4,686,369

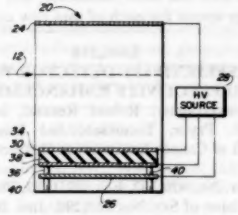
ELECTRIC SHIELDING FOR KINESTATIC CHARGE DETECTOR

David L. McDaniel, Dousman; Paul R. Granfors, Milwaukee, and David M. Hoffman, New Berlin, all of Wis., assignors to General Electric Company, Milwaukee, Wis.

Filed Dec. 13, 1985, Ser. No. 808,610

Int. Cl.[4] G01T *1/185*

U.S. Cl. 250—385 **15 Claims**



9. In a kinestatic charge detection system wherein a plural element planar detector detects secondary energy generated in a defined space from collision of particles of x-ray radiation beam with a medium located in the space, the secondary energy being directed toward the detector at a controlled velocity by an electric field created across the space, the detector and defined space being moved at the same velocity as the secondary energy in an opposite direction wherein the secondary energy remains stationary with respect to the x-ray radiation, the improvement comprising:

a control grid located within the space adjacent and parallel the detector for minimizing induced charge on the detector from the secondary energy until the secondary energy passes through the grid, said grid comprising an electrically insulative support member formed in a relatively thin sheet and being substantially co-extensive with the detector, a first elecrically conductive plate member attached to a first surface of said support member and a second electrically conductive plate member attached to a second surface of said support member; and

means for applying a different electric potential to each of said conductive plate members so as to create an electric field through said grid; and

means for supporting said support member in a predetermined spaced relationship with respect to the detector.

4,686,370

IONIZING CHAMBER FOR GASEOUS OXYGEN

Thomas Blach, Buxtehude, Fed. Rep. of Germany, assignor to Biomed-Electronic GMBH & Co. Medizinischer Geratebau KG, Buxtehude, Fed. Rep. of Germany

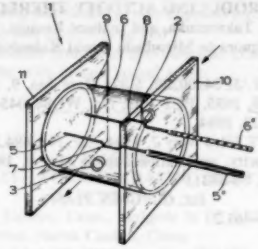
Filed Feb. 13, 1985, Ser. No. 700,777

Claims priority, application Fed. Rep. of Germany, Feb. 13, 1984, 3405008; Mar. 28, 1984, 3411335

Int. Cl.[4] H01J *27/00*

U.S. Cl. 250—423 R **17 Claims**

1. An ionization chamber for the ionization of gaseous oxygen in a gas stream, comprising a housing formed with an inlet for said stream and an outlet for ionized oxygen and traversed by said stream in a given direction between said inlet and said outlet, a pair of electrodes mounted in said housing and extending across said stream transverse to said flow direction with said electrodes spaced apart in said direction and at least one of said electrodes formed from a copper wire provided with a lacquer coating, and a direct current source connected across



said electrodes whereby one of said electrodes forms an anode and another of said electrodes forms a cathode.

4,686,371

APPARATUS FOR MEASURING FLUORESCENCE DECAY CHARACTERISTICS OF MATERIALS

David J. S. Birch, and Robert E. Imhof, both of Glasgow, Scotland, assignors to University of Strathclyde, Glasgow, Scotland

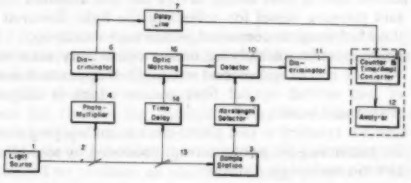
PCT No. PCT/GB85/00028, § 371 Date Sep. 18, 1985, § 102(e) Date Sep. 18, 1985, PCT Pub. No. WO85/03352, PCT Pub. Date Aug. 1, 1985

PCT Filed Jan. 21, 1985, Ser. No. 778,451

Claims priority, application United Kingdom, Jan. 21, 1984, 8401672

Int. Cl.[4] G01N *21/64*

U.S. Cl. 250—461.1 **9 Claims**



1. Apparatus for measuring fluorescence characteristics of a material sample, comprising:

a sample station for receiving a material sample the fluorescence characteristics of which are to be measured,

fluorescence photon-event receiving means coupled to said sample station to receive single photon events arising therefrom,

an excitation light source capable of emitting a train of excitation light pulses towards said sample station so as to irradiate a sample therein,

excitation pulse profile determining means, sensitive to said train of excitation light pulses and having sufficient attenuation to provide an output event count rate compatible with the fluorescence photon event count rate,

detecting means coupled to receive the output of said receiving means and the output of said determining means,

synchronization means operable by said excitation light source to generate a train of synchronization pulses,

measuring means coupled to the output of said detecting means and to the output of said synchronization means and operable according to the photon correlation technique to provide on a time-shared basis a measure of said fluorescence characteristics and a measure of said excitation pulse profile, said measuring means including discrimination means enabling said excitation pulse profile measure to be distinguished from said fluorescence characteristics measure.

4,686,372
METHOD AND APPARATUS FOR MEASURING CELL COUNTS OF METHANOGENS OR METHANE PRODUCING ACTIVITY THEREOF

Isoda Satoru, Takarazuka, and Inatomi Kenichi, Itami, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

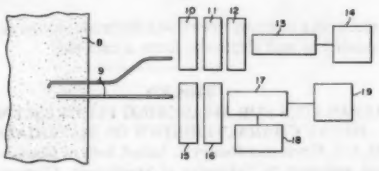
PCT No. PCT/JP84/00230, § 371 Date Jan. 9, 1985, § 102(e) Date Jan. 9, 1985, PCT Pub. No. WO84/04544, PCT Pub. Date Nov. 22, 1984

PCT Filed May 7, 1984, Ser. No. 694,384

Claims priority, application Japan, May 9, 1983, 58-81912; Feb. 28, 1984, 59-38311

Int. Cl.[4] G01N *21/64*

U.S. Cl. 250—461.2 **12 Claims**



1. An apparatus for measuring cell counts or methane producing activity of Methanogens contained within a vessel comprising:

a light source means for generating light of a particular wavelength;

a first optical fiber means operatively associated with said light source means for transmitting the light from said light source means into said vessel causing the Methanogens to fluoresce;

a second optical fiber means having one end disposed inside said pressure vessel for collecting the light flowered by the Methanogens contained within said vessel;

a photo-electric multiplying means operatively associated with the end of said second optical fiber opposite that end of said second optical fiber means which is disposed within said vessel; and

a detector coupled to said photo-electric multiplying means for measuring the photo current produced by said photo-electric multiplying means.

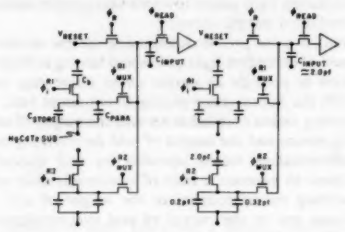
4,686,373
INFRARED IMAGER

Claude E. Tew, Dallas, and Adam J. Lewis, Jr., Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 528,317, Aug. 31, 1983, abandoned. This application Apr. 15, 1986, Ser. No. 853,369

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—578 **15 Claims**



1. An infrared detector array, comprising:

(a) a plurality of pixels arranged into rows and columns:

(b) a plurality of row conductors, a row conductor along each row of pixels;

(c) a plurality of column conductors, a column conductor along each column of pixels;

(d) at least one third conductor;

(e) each of said pixels separately including:

i. a first capacitor formed as at least partially a depletion region in a semiconductor member with the semiconductor of bandgap less than the energy of the infrared photons to be detected and with said semiconductor member exposed to the infrared photons to be detected;

ii. a first switch connected between a first plate of said first capacitor and said row conductor for the row of the pixel and with the control of said first switch connected to said column conductor for the column of the pixel; and

iii. a second capacitor with a second plate connected to said first plate of said first capacitor through a second switch, the control of said second switch connected to said at least one third conductor; and

(f) a voltage sensor for each of said row conductors.

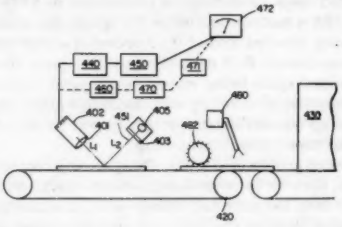
4,686,374
SURFACE REFLECTIVITY DETECTOR WITH OIL MIST REFLECTIVITY ENHANCEMENT

Nicholas Liptay-Wagner; Roland Renaud, both of Windsor; Timothy R. Pryor, Tecumseh, and Donald A. Clarke, Windsor, all of Canada, assignors to Diffracto Ltd., Windsor, Canada

Division of Ser. No. 470,262, Feb. 25, 1983, Pat. No. 4,585,947, which is a division of Ser. No. 163,290, Jun. 26, 1980, Pat. No. 4,394,683. This application Oct. 16, 1985, Ser. No. 788,118

Int. Cl.[4] G01N *21/86*

U.S. Cl. 250—571 **28 Claims**



1. A method for inspecting the surface of objects such as panels for automotive vehicles or the like, said method comprising:

spraying a surface of the object with an oil mist to increase the reflectivity of the surface of the object and to thereby enable the detection of light reflected therefrom by an optical-electrical detector;

illuminating the object with light to produce a light image for detection by a said optical-electrial detector;

detecting the light image using a said optical-electrical detector; and

analyzing the output of said optical-electrical detector so as to determine surface features of the object.

4,686,375
UNINTERRUPTIBLE POWER SUPPLY COGENERATION SYSTEM

Carlos F. Gottfried, Mexico City, Mexico, assignor to Power Group International Corp., Houston, Tex.

Filed Mar. 5, 1986, Ser. No. 836,430

Int. Cl.[4] H02J *9/06*; H02P *9/42*

U.S. Cl. 290—2 **16 Claims**

1. A power system for providing an uninterruptible power supply comprising:

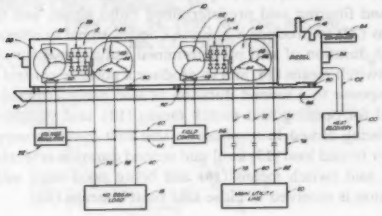
a first generator means for supplying energy to a primary load;

a second generator means connected to an electrical utility, said first and second generator means being connected by a common shaft, said first generator means being electrically isolated from said electrical utility;

prime mover means connected to said common shaft, said

prime mover means for supplying mechanical energy to said shaft; and

controller means interposed electrically between said second



generator means and said secondary external load, said controller means causing said second generator means to become disconnected from said secondary load upon interruptions in said secondary load.

4,686,376

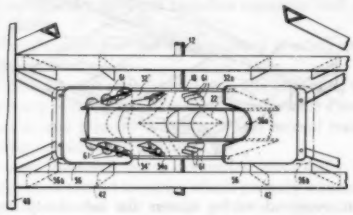
TIDE TURBINE

Philip Retz, 1783 Lanier Pl. NW., Washington, D.C. 20009

Filed Jul. 22, 1986, Ser. No. 888,065

Int. Cl.[4] F03D *3/04*

U.S. Cl. 290—42 **24 Claims**



1. A turbine for generating rotational energy from water power, comprising a circular array of scoops affixed to a hub, said hub being journaled for rotation about a vertical axis, a pair of generally circular disks having shoulders top and bottom disposed about said hub and affixed to either side of said scoops to define chambers between adjacent ones of said scoops, said disks having circular openings therein disposed concentrically about their axes for egress of water from said chambers essentially along the axis of rotation of said hub, and baffle means positioned outside said turbine scoops and fixed with respect to said axis of rotation so as to prevent water flow into ones of said chambers located in predetermined ralation to said baffle means, whereby a net rotational force is imparted to said turbine when disposed in water flowing generally perpendicular to said vertical axis.

4,686,377

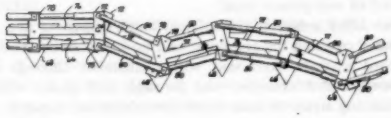
SYSTEM FOR GENERATING POWER FROM WAVES

Gary Gargos, 355 W. Windsor Rd., Glendale, Calif. 91204

Continuation-in-part of Ser. No. 818,091, Jan. 10, 1986. This application Apr. 8, 1986, Ser. No. 849,417

Int. Cl.[4] F03B *13/12*

U.S. Cl. 290—53 **5 Claims**



1. A system for generating power from waves in a body of water, comprising

a plurality of floatable vessels;

a plurality of compound bell cranks having a central arm pinned at each end to adjacent said vessels and lateral arms extending outwardly in two opposed directions from each end of said central arm; and

hydraulic cylinders pinned to alternate said compound bell cranks at the ends of said lateral arms.

4,686,378

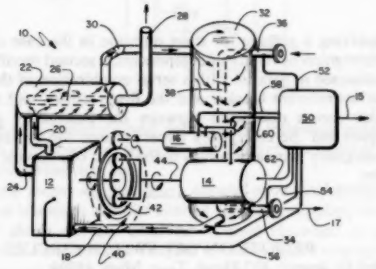
APPARATUS FOR GENERATING HEAT AND ELECTRICITY

Robert A. Sisk, Canton, Conn., assignor to ETA Thermal Systems Corporation, North Canton, Conn.

Filed Jul. 15, 1985, Ser. No. 754,638

Int. Cl.[4] F01K *17/02*

U.S. Cl. 290—2 **35 Claims**



1. An apparatus for generating thermal and electrical energy outputs in response to thermal and electrical load requirements imposed thereon, said apparatus comprising:

a variable speed power source;

means for transferring thermal energy from said power source to a coolant fluid;

a synchronous generator driven by said power source and adapted to produce an electrical energy output for said electrical load, the output frequency of said generator being independent of the speed of said power source;

means for extracting thermal energy from said fluid and directing said thermal energy output to said thermal load;

drive means for transferring the output of said power source to said generator and which permits the independently variable operation of said power source and said generator; and

means for monitoring said loads and controlling said thermal and electrical outputs independently, in response to variations in thermal and electrical loads caused by economic and external thermal and electrical supply factors, by independently varying the speed of said power source and the output frequency of said generator to provide said thermal and electrical outputs.

4,686,379

NO-BREAK POWER SUPPLY SYSTEM

Eiji Ohnari, Fukuoka, Japan, assignor to Eikoh Giken Co., Ltd., Japan

Filed Jun. 18, 1986, Ser. No. 875,498

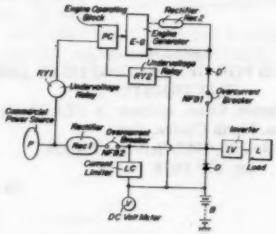
Claims priority, application Japan, Dec. 24, 1985, 60-197366[U]; Jan. 14, 1986, 61-3466

Int. Cl.[4] H02J *7/00*

U.S. Cl. 307—66 **8 Claims**

1. A no-break power supply system comprising a switch connected to a main or commercial power supply source and having first and second contacts, a first rectifier means con-

nected to the switch through an overcurrent breaker, an inverter connected to the first rectifier means for supplying an output with constant voltage and constant frequency to a load, an emergency generator means connected to the switch for generating a supply voltage in the case of service interruption or failure of components, an emergency battery means connected between the input of the inverter and a ground for



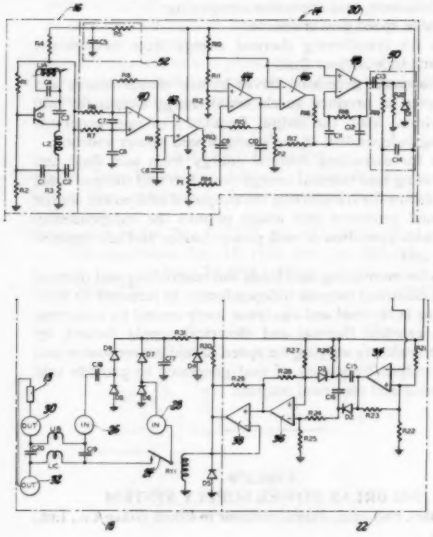
supplying a voltage for short duration in the case of service interruption or failure of components, a second rectifier means connected in parallel with a series combination of the switch, the overcurrent breaker and the first rectifier, and a voltage relay means connected between the emergency generator means and the emergency battery means for starting up the emergency generator means in the event of a service interruption.

4,686,380

REMOTE ON/OFF SWITCH CIRCUIT

Paul G. Angott, 457 Hurst, Troy, Mich. 48098

Filed Feb. 7, 1986, Ser. No. 827,363
Int. Cl.[4] H02B *1/24*
U.S. Cl. 307—125 **17 Claims**



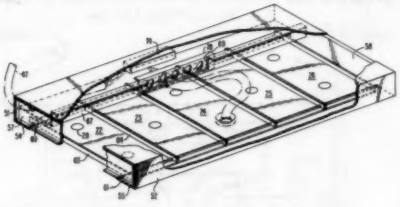
1. A remotely controlled electrical power assembly including a circuit (**14**) for supplying power to an electrical load (**13**) requiring electrical power from an electrical outlet, said circuit comprising; radio signal receiver means (**14**) for electrically supplying power in response to a predetermined radio signal, and including a super-generative detector (**16**) for receiving said predetermined radio signal, switch means (**18**) to close a power circuit (**24**) in response to a control signal for supplying power to said load (**13**), amplifier filter means (**20**) for amplifying and filtering said predetermined radio signal, and trigger means (**22**) to produce a positive control signal in response to a first duration of said predetermined radio signal for closing said switch means (**18**) and to produce a positive control signal in response to a second duration of said predetermined radio signal for opening said switch means (**18**), said switch means (**18**) being closed in response to said first duration supplying power to said load (**13**) until said second duration is received to open said switch means (**18**) and being open until said first duration is received to close said switch means (**18**).

4,686,381

OVERHEAD WIRING SYSTEM

William C. Boteler, Bridgeport, and Alfred L. Ehrenfels, Cheshire, both of Conn., assignors to Hubbell Incorporated, Orange, Conn.

Filed Jun. 30, 1986, Ser. No. 880,304
Int. Cl.[4] H02G *3/28*
U.S. Cl. 307—147 **16 Claims**



1. An overhead wiring system for selectively supplying electrical power to one or more specific locations in a space comprising the combinations of

a generally rectangular housing having top, side and end walls and a substantially open bottom;

a power cord having a connector at one end thereof;

a plurality of movable panels forming a substantially closed bottom wall of said housing, at least one of said panels having an opening through which said power cord can pass;

means on said housing for releasably supporting a predetermined number of said panels so that the bottom of said housing is substantially closed, said panels being rearrangeable to position said at least one panel at a desired location relative to said housing with said panels again closing said bottom of said housing;

a barrier within said housing dividing the interior thereof into a wiring chamber and a power cord chamber, said barrier having an opening therethrough for said power cord;

means in at least one of said walls of said housing for admitting a power cable or conduit into said wiring chamber for delivering power thereto;

connector means in said wiring chamber for connecting wires in said power cable or conduit to wires at the other end of said power cord;

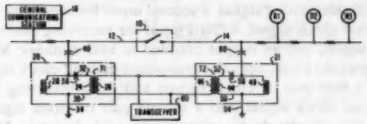
strain relief means in one of said barrier opening and said panel opening for engaging said power cord so that said cord extends from said wiring chamber through said power cord chamber and through said panel without exerting strain on said connector means and depends to a specific location; and

means for supporting said housing.

4,686,382
SWITCH BYPASS CIRCUIT FOR POWER LINE COMMUNICATION SYSTEMS

Kenneth C. Shuey, Raleigh, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 14, 1985, Ser. No. 765,470
Int. Cl.[4] H04B *3/56*
U.S. Cl. 307—149 **4 Claims**



1. Apparatus for coupling a power line communication signal around a switch, comprising:

a first transformer having a primary winding and a secondary winding;

a first inductor connected electrically in parallel with said primary winding of said first transformer, a first terminus of said primary winding of said first transformer being connected to ground;

a first capacitor being connected electrically in series between a second terminus of said primary winding of said first transformer and said first inductor, a first side of a power line switch being electrically connectable to said first capacitor between said first capacitor and said first inductor;

a second transformer having a primary winding and a secondary winding;

a second inductor connected electrically in parallel with said primary winding of said second transformer, a first terminus of said primary winding of said second transformer being connected to ground;

a second capacitor being connected electrically in series between a second terminus of said primary winding of said transformer and said second inductor, a second side of a power line switch being electrically connectable to said second capacitor between said second capacitor and said second inductor;

a first terminus of said secondary winding of said first transformer being connected in electrical communication with a first terminus of said secondary winding of said second transformer; and

a second terminus of said secondary winding of said first transformer being connected in electrical communication with a second terminus of said secondary winding of said second transformer;

a transceiver connected in electrical communication with said first terminus and said second terminus of said secondary winding of said first transformer.

4,686,383
ELECTRONIC SWITCH WITH AUTOMATIC PROTECTIVE TURN-OFF FOLLOWED BY AUTOMATIC RESET

David C. Croft, Suffolk, United Kingdom, assignor to British Telecommunications Public Limited Company, United Kingdom

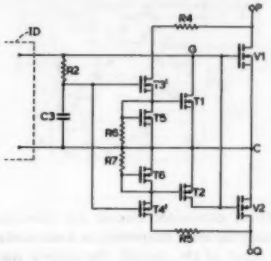
Filed Aug. 10, 1984, Ser. No. 639,328
Claims priority, application United Kingdom, Aug. 10, 1983, 8321549
Int. Cl.[4] H02H *3/20;* **H03K** *17/08, 17/687*
U.S. Cl. 307—200 B **8 Claims**

1. A switch comprising:

a switch transistor having a control electrode and also having a controlled path for connection in a circuit to be switched;

first means connected to said switch transistor for supplying control signals to said control electrode to render the controlled path conductive;

trip means including a second transistor connected to said first means and in a bypass path from the control electrode of said switch transistor and activated by a potential difference across said controlled path exceeding a threshold value to close said bypass path and render said switch transistor non-conducting, the trip means being connected to receive said control signals via delay means and said potential difference without substantial delay, so as to permit operation of the trip means only after the expiration of a predetermined delay period following application of said control signals to the control electrode of the switch transistor; and

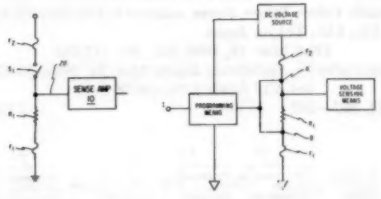


said trip means also including control means comprising a third transistor with its control electrode supplied via an RC delay element from the control electrode of said switch transistor and coupled to said switch transistor to open said bypass path when rendered non-conductive thus rendering said switch transistor at least partially conductive at the expiration of a predetermined delay period following actuation of the trip means.

4,686,384
FUSE PROGRAMMABLE DC LEVEL GENERATOR

Ian E. Harvey; David G. Williams, both of Melbourne; Barbara J. Fisher, and Timothy J. Johnson, both of Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Aug. 9, 1985, Ser. No. 763,861
Int. Cl.[4] H03K *19/094, 19/173;* **G11C** *17/00, 7/00*
U.S. Cl. 307—202.1 **19 Claims**



1. An improved circuit arrangement for a digital logic element comprising;

a signal sensing element having an input terminal and an output terminal,

said input terminal connected to a first node between a ground node and a signal source,

at least one first fuse element connected between said first node and said ground node,

at least one second fuse element connected between said first node and said signal source,

means for blowing selected ones of said fuse elements.

4,686,385
WAVEFORM CONVERTER CIRCUIT

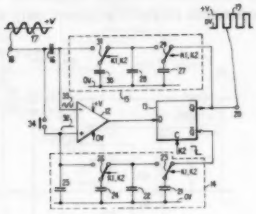
Robin Sharpe, Carshalton, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 6, 1984, Ser. No. 597,297

Claims priority, application United Kingdom, Apr. 29, 1983, 8311762

Int. Cl.⁴ H03K *5/08*

U.S. Cl. 307—261 **11 Claims**



1. A waveform converter circuit for obtaining a square waveform having the same frequency as a sinusoidal waveform applied to an input of the circuit, the square waveform also having a substantially unity mark space ratio between two given amplitude levels for a range of peak-to-peak amplitude levels of the sinusoidal waveform, said converter circuit comprising a differential amplifier having a first input connected to the input of the converter circuit for receiving said sinusoidal waveform, a second input for receiving a first reference signal, and an output connected to an input of a flip-flop having inverting and non-inverting data outputs, and first and second clocked switched capacitor filter means said first filter means coupled between one output of said flip-flop and said second input of said differential amplifier for providing said first reference signal, and said second filter means coupled between the other output of said flip-flop and the first input of said differential amplifier for combining a second reference signal with said sinusoidal waveform, said second reference signal establishing a direct voltage level for the sinusoidal waveform which is maintained at substantially the same value as said first reference signal, one of said reference signals being proportional, and the other inversely proportional, to the mark/space ratio of the output square waveform.

4,686,386
POWER-DOWN CIRCUITS FOR DYNAMIC MOS INTEGRATED CIRCUITS

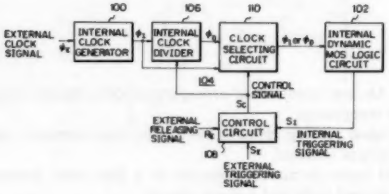
Takahashi Tadao, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1985, Ser. No. 712,753

Claims priority, application Japan, Mar. 21, 1984, 59-52372

Int. Cl.⁴ G06F *1/04;* **H03K** *5/13*

U.S. Cl. 307—269 **3 Claims**



1. A power-down circuit for reducing operational power consumption of a dynamic MOS integrated circuit during idling conditions, said power-down circuit comprising:

a clock divider for generating a divided clock signal in response to an internal clock signal inputted thereto while receiving a control signal, said divided clock signal being synchronized with said internal clock signal and having a repetition rate which is slower than that of said internal clock signal;

a control circuit for delivering said control signal when a triggering signal from said dynamic MOS integrated circuit or from an external triggering signal source is inputted thereto; and

a clock selecting circuit having a first input for receiving said divided clock signal, a second input for receiving said internal clock signal, a third input for receiving said control signal, and an output coupled to said dynamic MOS integrated circuit, for converting said divided clock signal into a first pair of clock signals and for converting said internal clock signal into a second pair of clock signals, and for selectively transferring to said dynamic MOS integrated circuit either said first pair of clock signals or said second pair of clock signals in response to said control signal, said first pair of clock signals being nonoverlapping with respect to each other and said second pair of clock signals being nonoverlapping with respect to each other.

4,686,387
BIASING CIRCUIT FOR A FIELD EFFECT TRANSISTOR

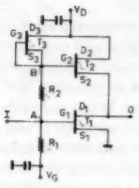
Christian Rumelhard, Creteil, France, assignor to Thomson-CSF, Paris, France

Filed Jan. 17, 1985, Ser. No. 692,127

Claims priority, application France, Jan. 20, 1984, 84 00889

Int. Cl.⁴ H03K *17/284, 17/687;* **H03G** *11/04;* **H04B** *3/04*

U.S. Cl. 307—296 R **7 Claims**



1. In a circuit for biasing a first field effect transistor, operating in the ultra high frequency range, whose gate is biased by a voltage through a first resistor, at least one main electrode of the first transistor, through which the ultra high frequency signal leaves, is biased from a voltage source through a second field effect transistor operating as a saturable load, whose gate-source voltage follows the gate-source voltage of the first transistor, the gate of the first transistor and the gate of the second transistor being connected at two points of a divider bridge formed by at least two resistors including said first resistor, supplied from the voltage source and the bias voltage through a third transistor connected as current source, the gate of said third transistor also being connected to the divider bridge.

4,686,388
INTEGRATED CIRCUIT SUBSTRATE BIAS SELECTION CIRCUIT

Warren G. Hafner, Lake Carmel, N.Y., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Mar. 12, 1985, Ser. No. 710,801

Int. Cl.⁴ G05F *3/16*

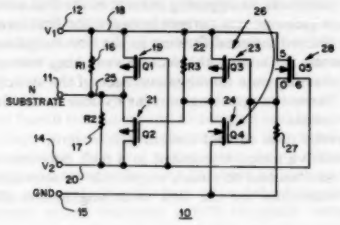
U.S. Cl. 307—296 R **4 Claims**

1. In an integrated circuit including a substrate connected thereto, a substrate bias selection circuit, the substrate bias selection circuit comprising:

means for providing a first and second voltage and a reference voltage to the integrated circuit,

means coupled to the providing means for sensing whether

the first or the second voltage applied to the circuit is higher, said sensing means including a first and second MOSFET circuit means, each said first and second MOS-



FET circuit means a first P-channel MOSFET respectively connected in parallel with a registor, and

means coupled to the sensing means for applying the higher of the first or second voltages to the substrate.

4,686,389

LOGIC FOR A PEAK VALUE STORE

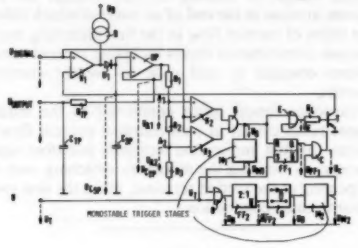
Hans-Karl Seifert, Renningen, Fed. Rep. of Germany, assignor to TELEFUNKEN electronic GmbH, Heilbronn, Fed. Rep. of Germany

Filed Mar. 22, 1985, Ser. No. 715,023

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1984, 3411828

Int. Cl.[4] H03K *5/153*

U.S. Cl. 307—351 **9 Claims**



1. Discharge monitoring circuit for a store which stores the peak values of a periodic signal with varying amplitude, the store comprising: a store capacitor (C_{Sp}) which is charged to the peak value of the signal in one period via a charging circuit (Q, D_1, K_1) and which stores this peak value in the following period until the signal has reached a defined percentage value of the stored peak value as determined by a comparator circuit (OP, R_1, R_2, R_3, K_2, K_3, G), in order to then be discharged to the instantaneous value of the signal with the aid of a discharge circuit (R_4, T), wherein said discharge monitoring circuit comprises circuit means (M_1, B, FF_2, D, M_2, C, FF_1, E) by means of which the store capacitor (C_{Sp}) is discharged at least almost to ground potential at the end of the period in cases where the signal does not reach the predetermined percentage value of the instantaneously stored peak value, so that the voltage at the store capacitor (C_{Sp}) is again able to follow the peak values of the signal, and wherein the store capacitor (C_{Sp}) is discharged to the instantaneous voltage value of the signal to be stored within one period when the discharge transistor (T) is driven by needle pulses which are regulated in their pulse width, and in that the store capacitor (C_{Sp}) is discharged almost to ground potential at the end of each period when the discharge transistor (T) of the discharge circuit is driven by pulses which are controlled in their pulse width.

4,686,390

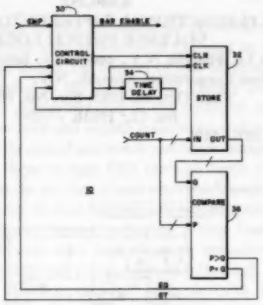
DIGITAL PEAK-HOLD CIRCUIT

Edward J. Cleary, Jr., Aloha, and Mike R. Coleman, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 26, 1986, Ser. No. 878,549

Int. Cl.[4] H03K *5/153*; G01R *19/04*

U.S. Cl. 307—351 **5 Claims**



1. A digital peak-hold detector comprises:

means for storing a digital value representative of a current peak value;

means for determining when the value of an input analog voltage is greater than or equal to a ramp-like voltage corresponding to a repetitive count cycle to generate a compare output;

means for comparing the current peak value from the storing means with the repetitive count cycle to determine when the count of the repetitive count cycle is equal to or greater than the current peak value to generate an update output; and

means for updating the current peak value in the storing means from a combination of the compare output and the update output when the input analog voltage equals or exceeds the current peak value.

4,686,391

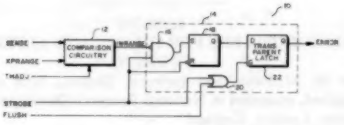
FAST-ACTING COMPARISON CIRCUIT

Algird M. Gudaitis, Stow, Mass., assignor to GenRad, Inc., Concord, Mass.

Filed May 8, 1986, Ser. No. 860,819

Int. Cl.[4] H03K *5/153*

U.S. Cl. 307—354 **6 Claims**



1. An error-detection circuit comprising:

A. an error indicator adapted for application thereto of a binary in-range signal and operable to generate an error indication if the in-range signal is on one side of a transition level;

B. a comparison circuit, adapted for reception of an analog sense signal, for generating and applying to the error indicator the in-range signal, whose value changes by a predetermined voltage swing from one to the other of first and second voltage levels through the transition level when the sense signal passes into or out of a predetermined range, one of the first and second voltage levels differing from the transition level by less than one-quarter

of the voltage swing, whereby the time required for the error-detection circuit to react to passage of the sense signal through a boundary of predetermined range in one direction is less than the time that would be required if the first and second voltage levels were nearly equidistant from the transition level.

4,686,392

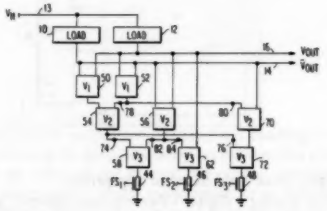
MULTI-FUNCTIONAL DIFFERENTIAL CASCODE VOLTAGE SWITCH LOGIC

Tin-Chee Lo, Fishkill, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 30, 1985, Ser. No. 792,933

Int. Cl.[4] H03K *17/693*

U.S. Cl. 307—448 **1 Claim**



1. A method of designing a logic circuit, comprising the steps of:

providing at least three logic blocks, each logic block comprising a plurality of connected transistors controlled by input logic signals to selectively provide one and only one conductivity path between a selection node and the combination of two block output nodes;

connecting two loads between a first predetermined reference potential and two logic signal output nodes;

connecting said block output nodes to said logic signal output nodes, said logic signal output nodes providing complementary signals;

connecting at least three selection transistors between respective selection nodes and a second predetermined reference potential, said selection transistors providing selection of one of said logic blocks;

identifying at least two voltage nodes in at least two separate ones of said logic blocks having functionally equivalent sets of connections to said logic signal output nodes;

connecting said identical voltage nodes; and

eliminating transistors in a path from all but one of said identical voltage nodes to said logic signal output nodes.

4,686,393

CIRCUIT BREAKERS FOR DIRECT AND ALTERNATING CURRENT

Peter M. McEwan, and Iorwerth Thomas, both of Preston, England, assignors to National Research Development Corporation, London, England

Filed Jan. 30, 1985, Ser. No. 696,493

Claims priority, application United Kingdom, Feb. 1, 1984, 8402629

Int. Cl.[4] H02H *3/08*

U.S. Cl. 307—31 **18 Claims**

1. A circuit breaker comprising:

first switching means connected to carry current between a first terminal and a second terminal of the circuit breaker, the first switching means including a gated switching means which when conducting current remains in a low impedance state until, at least, the current ceases,

control means for providing a switching signal when the circuit breaker is required to cease carrying the current,

first commutation means including a capacitor means forming part of an inductance-capacitance circuit,

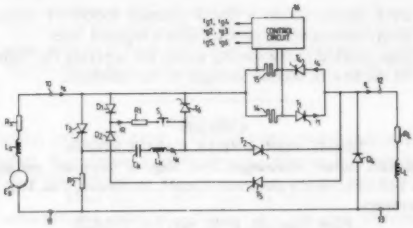
second switching means for connecting the inductance-capacitance circuit across the first switching means,

means for charging the capacitor means to cause the capacitor means to pass, when the second switching means conducts, an opposing current to the first switching means which opposes current between the first terminal and the second terminal flowing in the first switching means,

means for setting the second switching means into a conducting state on the occurrence of the switching signal to cause the opposing current to flow in the first switching means

whereby total current therein falls to zero,

resistive means connected in a path between said first and said second terminals to provide an alternative circuit to substitute for the first switching means after the total



current flow has fallen to zero, for current passing into the circuit breaker by way of the first terminal, and

second commutation means different from the first commutation means for causing current through the resistive means to cease at the end of an interval which follows the cessation of current flow in the first switching means, the second commutation means including current-controlling means coupled to said path to control current flow therein,

the capacitor means being connected in the inductance-capacitance circuit to pass transient current flowing between the first and second terminals and store significant energy, so reducing the maximum switching over-voltage appearing at the second terminal, when the first switching means ceases conduction.

4,686,394

ECL CIRCUIT WITH CURRENT-SPLITTING NETWORK

Nim C. Lam, Sunnyvale, Calif., assignor to Fairchild Semiconductor, Cupertino, Calif.

Filed Feb. 25, 1986, Ser. No. 832,796

Int. Cl.[4] H03K *19/086*

U.S. Cl. 307—455 **14 Claims**

1. An ECL circuit comprising:

voltage means for providing multiple voltage levels, said voltage means including high source voltage means for supplying a relatively high source voltage, low source voltage means for supplying a relatively low source voltage, high reference voltage means for providing a high reference voltage between said high source voltage and said low source voltage, and low reference voltage means for supplying a low reference voltage between said high reference voltage means and said low source voltage;

first transistor means including a first transistor, said first transistor having its emitter coupled to said low source voltage means, said first transistor means including means for supplying a voltage to the base of said first transistor so as to maintain a substantially constant current therethrough;

second transistor means including a second transistor with its emitter coupled to the collector of said first transistor;

third transistor means including a third transistor with its emitter coupled to the collector of said first transistor;

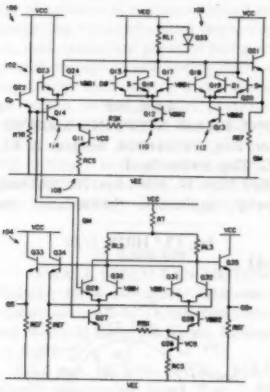
fourth transistor means including a fourth transistor with its emitter coupled to the collector of said first transistor;

first gating means for turning on said fourth transistor while turning off said second and third transistors andfor turning off said fourth transistor while turning on said second and third transistors, said first gating means including means for receiving a first binary signal characterized at different times by voltages above and below said low reference voltage, said first gating means being coupled to apply said first binary signal to the base of at least one of said third and fourth transistors and to coupled said low reference voltage to the base of the other of said third and fourth transistors, said first gating means being arranged to provide the same voltage to the base of said second transistor as is applied to the base of said third transistor;

fifth transistor means including a fifth transistor with its emitter coupled to the collector of said second transistor;

sixth transistor means including a sixth transistor with its emitter coupled to the collector of said second transistor, said sixth transistor having its base coupled to said high reference source voltage;

second gating means for supplying a second binary signal to the base of said fifth transistor, said second binary signal being characterized at different times by a voltage above said high reference voltage and a voltage below said high



reference voltage so that when said second binary signal's voltage is above said high reference voltage said sixth transistor is off and when said second binary signal's voltage is below said high reference voltage said fifth transistor is off;

seventh transistor means including a seventh transistor with its emitter coupled to the collector of said third transistor;

eighth transistor means including an eighth transistor with its emitter coupled to the collector of said third transistor, said eighth transistor having its base coupled to said high reference voltage means;

third gating means for supplying a third binary signal to the base of said seventh transistor, said third binary signal being characterized at different times by a voltage above said high reference voltage and a voltage below said high reference voltage so that when said third binary signal's voltage is above said high reference voltage said eighth transistor is off and when said third binary signal's voltage is below said high reference voltage said seventh transistor is off;

ninth transistor means including a ninth transistor with its emitter coupled to the collector of said fourth transistor;

tenth transistor means including a tenth transistor with its emitter coupled to the collector of said fourth transistor, said tenth transistor having its base coupled to said high reference voltage means;

fourth gating means for supplying a fourth binary signal to the base of said ninth transistor, said fourth binary signal being characterized at different times by a voltage above said high reference voltage and a voltage below said high reference voltage so that when said fourth binary signal's voltage is above said high reference voltage said tenth transistor is off and when said fourth binary signal's voltage is below said high reference voltage said ninth transistor is off;

eleventh transistor means including an eleventh transistor with its collector and its base both coupled to said high source voltage means, the emitter of said eleventh transistor being coupled to the collector of exactly one of said fifth and sixth transistors and to the collector of exactly one of said seventh and eighth transistors and to the collector of exactly one of said ninth and tenth transistors, the collectors of those of said fifth through tenth transistors not coupled to the emitter of said eleventh transistor being coupled directly to said high source voltage means, said eleventh transistor means including a first lead resistor coupled in parallel with said eleventh transistor so that when substantially all current flowing through said first transistor is flowing through said eleventh transistor means the voltage drop across said eleventh transistor is substantially equal to the voltage drop across said first load resistor; and

first output means coupled to the emitter of said eleventh transistor for providing a first output voltage as a function of said first, second, third and fourth select signals.

4,686,395

CURRENT SWITCHING TYPE LOGIC CIRCUIT

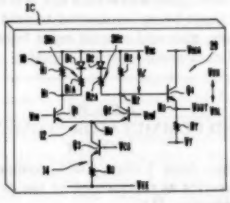
Fumihiko Sato, and Kazuyoshi Yamada, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jul. 29, 1985, Ser. No. 760,326

Claims priority, application Japan, Aug. 9, 1984, 59-167131

Int. Cl.[4] H03K *19/003, 19/086*

U.S. Cl. 307—455 **21 Claims**



1. A current switching type logic circuit comprising;

current switching circuit means including a differential signal input means and a constant current source, said differential signal input means having a pair of input points to which a voltage difference is applied, a pair of output points, and a pair of load elements connected between said output points and a power source; and

a pair of shunt circuits each connected in parallel with each of said load elements each of said shunt circuits including a diode and a resistive element connected in series, each of said diodes being connected in a forward direction with respect to said power source.

4,686,396

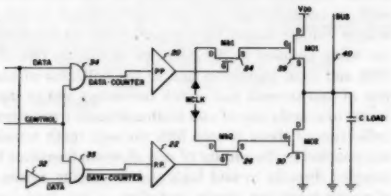
MINIMUM DELAY HIGH SPEED BUS DRIVER

Simon M. Law, Torrance, and Thien M. Ngo, Panorama City, both of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 26, 1985, Ser. No. 769,520

Int. Cl.[4] H03K *19/02, 17/687, 17/56*

U.S. Cl. 307—473 **5 Claims**



1. An integrated circuit tri-state bus driver circuit comprising:

a first MOS transistor (28) with drain, gate, and source electrodes, whose source is connected to an output terminal, which output terminal is connected to the bus to be driven, and whose drain is connected to a voltage source,

a second MOS transistor (30) with drain, gate, and source electrodes, whose source is connected to ground potential and whose drain is connected to said output terminal,

a third MOS transistor (24) with drain, gate, and source electrodes, whose source is connected to the gate of said first transistor (28),

a fourth MOS transistor (26) with drain, gate, and source electrodes, whose source is connected to the gate of said second transistor (30),

the drains of said third and fourth transistors being connected to a system clock signal,

a first buffer (20) with an input and an output, whose output is connected to the gate of said third transistor (24),

a second buffer (22) with an input and an output, whose output is connected to the gate of said fourth transistor (26),

the input to said first buffer (20) being connected to a source of two level binary data signals, and the input to said second buffer (22) being connected to a source of two level binary data signals complementary to said binary data signals connected to the input of said buffer (20),

said source of two level binary data signals including a first AND gate (34) whose output is connected to the input of said first buffer (20) and which has first and second inputs, said first input being connected to said source of binary data signals, and said second input being connected to a source of data enable control signals.

4,686,397

BRUSH AND COMMUTATOR SEGMENT TORQUER MOTOR

Jack W. Becker, Simi Valley, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

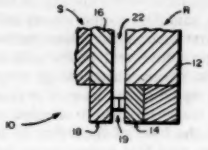
Continuation-in-part of Ser. No. 721,836, Apr. 11, 1985, abandoned. This application Sep. 3, 1986, Ser. No. 903,361

Int. Cl.[4] H02K *13/00, 41/06*

U.S. Cl. 310—36 **1 Claim**

1. A brush and commutator segment torquer motor comprising:

an electromagnetically cooperating stator and rotor, said stator and rotor each defining less than 360° segments, respectively, said rotor being disposed on the outside of said stator and including a multiplicity of commutator bars at the inner surface thereof, said commutator bars lying along the plane of curvature of said rotor, said stator having a rare earth permanent magnet field and a brush block assembly including brushes at the outer surface thereof, said brushes contacting said commutator bars at



said inner surface, and only a single air gap being radially disposed between said inner surface of said rotor and said outer surface of said stator.

4,686,398

ONE-PHASE STEPPING MOTOR

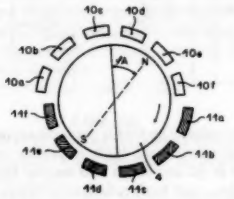
Hubert Lechner, Zug, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland

Filed Mar. 24, 1986, Ser. No. 843,064

Claims priority, application Switzerland, Apr. 1, 1985, 01407/85

Int. Cl.[4] H02K *7/10*

U.S. Cl. 310—41 **7 Claims**



1. A one-phase stepping motor comprising:

a rotor having an outer periphery and having a plurality of permanently magnetized poles arranged on its outer periphery;

a coil surrounding the rotor and defining a space between said rotor and said coil;

a housing for said rotor and said coil comprising first and second housing-halves; and

a plurality a pole arms extending from said housing-halves into the space between said coil and said rotor;

said pole arm arrangement providing said rotor with a predetermined direction of rotation; said pole arms being divided into at least two groups each group comprising a plurality of pole arms; within each group, starting with at least the second pole arm in the direction of rotation of said rotor, the radial distance between said pole arms and said rotor decreasing along the direction of rotation;

said pole arms and said housing being arranged with respect to said rotor to protect said rotor from external magnet fields.

4,686,399

ROTOR FOR ROTARY ELECTRICAL MACHINES

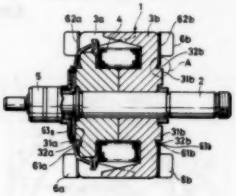
Hideo Imori, and Toshiyuki Takahara, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 23, 1984, Ser. No. 663,922

Claims priority, application Japan, Oct. 25, 1983, 58-166314[U]

Int. Cl.[4] H02K *9/06*

U.S. Cl. 310—62 **7 Claims**



1. A rotor of a rotary electrical machine, comprising:

(a) a field coil arranged around a rotary shaft;

(b) a pair of claw-shaped poles arranged to sandwich said field coil from axially opposite sides thereof having a plurality of cylindrical portions formed at outer side surfaces projecting outwardly from respective said outer side surfaces, said cylindrical portions being arranged concentrically with respect to said rotary shaft; and

(c) cooling blades each having a circular central opening through which said cylindrical portions fit when said cooling blades are positioned thereon, said cooling blades being fixed to said respective cylindrical portions by caulking through said circular central openings, said blades being further fixed to respective ones of said respective claw-shaped poles by welding.

4,686,400

SMALL SIZED FAN MOTOR

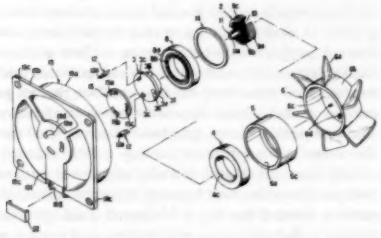
Kiyonori Fujisaki, 195-4 Ooyaguchi, Matsudo-shi, Chiba-ken; Toshio Kobayashi, 6-1-13 Kitakarasuyama, Setagaya-ku, Tokyo, and Heihachi Kato, 232 Terao, Kawagoe-shi, Saitama-ken, all of Japan

Filed Apr. 18, 1986, Ser. No. 853,723

Claims priority, application Japan, Aug. 5, 1985, 60-172659

Int. Cl.[4] H02K *21/12*

U.S. Cl. 310—67 R **11 Claims**



1. A small sized fan motor comprising:

an armature; support means for supporting said armature at one end thereof in cantilever fashion; rotor means including a cylindrical rotor having an inner cylindrical surface and an outer periphery and made of a magnetizable material; a permanent magnet mounted within said cylindrical rotor, said permanent magnet having an outer periphery fitted to said inner surface of said cylindrical rotor and an inner surface extending about said armature; fan means including a cylindrical body and a plurality of generally radial blades secured therearound, said cylindrical body being secured to the outer periphery of said cylindrical rotor; means for rotatably supporting said rotor from said support means including a radial bearing having an inner race and an outer race; and detector means including a plurality of Hall generators mounted on said support means; said support means including a disk-shaped member having a cylindrical support portion of a predetermined diameter; said inner race of the radial bearing being secured to said cylindrical support portion of said disk-shaped member, said outer race of the radial bearing being fitted to said inner cylindrical surface of said rotor in a manner that said radial bearing lies in substantially the same annulus as said permanent magnet but spaced therefrom in the axial direction within said cylindrical rotor, said Hall generators being mounted on said disk-shaped support merber radially thereof and angularly spaced from each other, and said Hall generators being located adjacent to said permanent magnet so as to detect the magnetic flux of said permanent magnet as the latter is rotated.

4,686,401

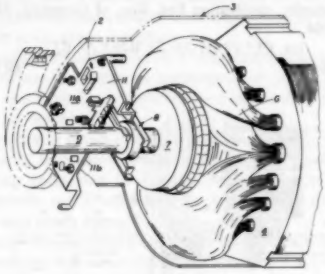
SWITCH ASSEMBLY FOR ELECTRICAL MACHINERY

Louis M. Gehrt, Jefferson County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Jan. 21, 1986, Ser. No. 820,228

Int. Cl.[4] H01H *35/10*

U.S. Cl. 310—68 E **4 Claims**



1. In an electric motor having a stator assembly and a rotor assembly, said rotor assembly including a shaft, said stator assembly including a plurality of windings, the selective energization of said windings being utilized to generate a force for rotating said rotor assembly, and a centrifugal actuator mounted to said shaft, the improvement which comprises a terminal board for electrically interconnecting said windings to a source of power, said terminal board having a switch assembly attached to it, said switch assembly adapted to interconnect respective ones of said windings to a source of power, said switch assembly including a first pair of electrical contacts mounted to said terminal board; a third electrical contact spacially displaced from said first pair of electrical contacts and mounted to said board; a conductive means mounted to said board including a base portion and at least three spaced, flexible linear conductive members extending outwardly from said base portion, each linear conductive member including an electrical contact positioned in opposed relation to an electrical contact on said board, with two of said linear conductive members being bent to bias said electrical contacts thereon toward said first pair of electrical contacts on said board and the third conductive member being oppositely bent to bias the electrical contact thereon toward said spacially displaced third electrical contact on said board; a switch arm mounted for movement between at least a first position and second position relative said terminal board in response to said centrifugal

actuator to provide selective energization of said windings, and switch arm engaging said linear conductive members to urge those electrical contacts thereon and opposed to said first pair of electrical contacts on said board into engagement while releasing said electrical contact opposed to said spacially displaced third electrical contact on said board when moved in one direction and vice versa when moved in a second direction; and means cooperative with at least certain of said opposed electrical contacts when urged into contact to provide yielding and resilient engagement therebetween to ensure electrical contact maintenance in the event of machinery impact and vibration, said last metnioned means including said conductive members, at least two of said conductive members having a reverse bend such that such members have overlapping portions.

4,686,402

DRIVE DEVICE FOR INDUCING SWINGING, ROTATION AND LINEAR MOVEMENTS

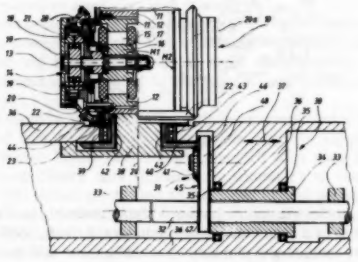
Karl-Heinz Wurst, Korntal-Münchingen, Fed. Rep. of Germany, assignor to Arnold Müller GmbH & Co KG, Kirchheim/Teck, Fed. Rep. of Germany

Filed May 20, 1986, Ser. No. 865,548

Claims priority, application Fed. Rep. of Germany, May 21, 1985, 3518104

Int. Cl.[4] F16H *25/20*; B25J *17/02*

U.S. Cl. 310—83 **10 Claims**



1. A drive device for inducing swinging, rotation and linear movements, comprising an articulated drive (**10**) formed as a drive unit which includes two coaxially positioned motors (**M1**, **M2**) each provided with a transmission and a path-and-speed measuring system, said drive unit having a pivot axis (**13**) and a rotation axis (**24**) extending transversely to said pivot axis, said drive unit generating a swinging movement about said pivot axis and a rotation movement about said rotation axis and said movements being superposed, and a drive element (**30**) to which said drive unit is releasably connected so that said drive unit is interchangeable, said drive unit being connected to said drive element such that said rotation movement about said rotation axis is induced to said drive element as a drive rotation movement, said drive element including transmission means (**31**, **45**) and said drive unit including a driving member (**22**) coupled to said transmission means, said driving member forming a drive for said drive element (**30**), said drive element being a linear drive in which at least one element is at least directly and via said transmission means loadable by said drive unit, said axis of rotation and a central axis of said linear drive extending at right angles to each other.

4,686,403

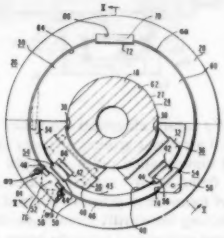
DYNAMOELECTRIC MACHINE WITH ROCKABLE BEARING SUPPORTS

Louis F. Hackstie, Lake Mary, Fla.; Joseph F. Briglia, Primos, Pa., and Albert Cohen, Winter Springs, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 7, 1986, Ser. No. 928,149

Int. Cl.[4] F16C *17/06*

U.S. Cl. 310—90 **20 Claims**



1. In combination with a dynamoelectric machine, said machine including a rotor, bearing means in supportive relationship with said rotor, said rotor having journal means for riding on said bearing means, the improvement which comprises:

said bearing means comprising a hollow cylindrical bearing housing means, an upper bearing section means for maintaining said rotor in position, said upper bearing section means housed within said bearing housing means, a lower bearing section means for supporting said rotor, said lower bearing section means including a lower bearing shell having a U-shaped cross-section, said lower bearing shell housed within said bearing housing means, a pair of rockable pedestal journal support members, said journal support members positioned between said journal portions of said rotor and said lower bearing shell, said journal support members including an inner journal portion in close proximity to said journal means and an outer curved portion in close proximity to said lower bearing shell, said journal support members having a first pocket means therein proximate said outer curved portion, said lower bearing shell proximate the inner surface thereof having a second pocket means disposed therein in alignment with said first pocket means, said lower bearing shell proximate the outer surface thereof having a first channel means axially disposed therein in radial alignment with said second pocket means, said housing means proximate the inner surface thereof having a V-shaped axial groove means therein radial alignment with said second pocket means, a first key means disposed within said first pocket means and said second pocket means of substantially fixing the position of each of said journal support members with respect to said lower bearing shell and said journal portions, said first key means including a curved surface, said journal support member riding on said curved surface of said first key means, a second key means disposed within said first channel means and said V-shaped groove means for providing ease in elevation adjustment of said rotor and for preventing said lower bearing shell from rotating.

4,686,404

CONTROLLED RADIAL MAGNETIC BEARING DEVICE

Tsugito Nakazeki; Shoji Nanami, both of Iwata, and Koichi Okada, Toyooka, all of Japan, assignors to NTN Toyo Bearing Co., Ltd., Osaka, Japan

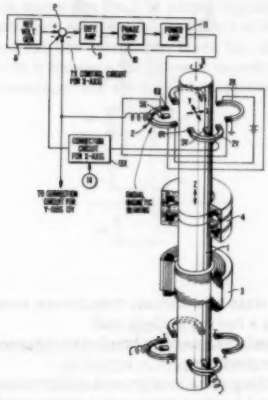
PCT No. PCT/JP85/00158, § 371 Date Jan. 10, 1986, § 102(e) Date Jan. 10, 1986, PCT Pub. No. WO85/05417, PCT Pub. Date Dec. 5, 1985

PCT Filed Apr. 2, 1985, Ser. No. 824,697

Claims priority, application Japan, May 18, 1984, 59-101506

Int. Cl.[4] F16C *39/06*

U.S. Cl. 310—90.5 6 Claims



1. A controlled radial magnetic bearing device having an X-axis electromagnet and a X-axis electromagnet provided on an X-axis and Y-axis perpendicular to each other in a plane normal to the axis of a rotary shaft for magnetically supporting the rotary shaft, X-axis and Y-axis position sensors provided on the X-axis and Y-axis for detecting any displacement of the rotary shaft from its reference position in the X-axis and Y-axis direction, respectively, and X-axis and Y-axis control circuits for feeding the outputs of said position sensors back to said electromagnets and thereby controlling the outputs of said electromagnets, further comprising a speed detecting means connected to each of said control circuits for detecting the speed of rotation of the rotary shaft, an X-axis correction circuit comprising a band-pass filter for extracting a reverse precession frequency component from an output of said Y-axis position sensor, said output being out of phase by 90 degrees with respect to said X-axis position, for controlling the position of the rotary shaft in the X-axis direction, a changing means for changing an output of said band-pass filter according to an output of said speed detecting means and an adder means for adding an output of said changing means to an output of said X-axis position sensor, said output leading in phase by 90 degrees from the reverse precession frequency, said X-axis correction circuit supplying its output to said X-axis control circuit, and a X-axis correction circuit comprising a band-pass filter for extracting a reverse precession frequency component from an output of said X-axis position sensor, said output being out of phase by 90 degrees with respect to said Y-axis position, for controlling the position of the rotary shaft in the Y-axis direction, a changing means for changing an output of said band-pass filter according to an output of said speed detecting means and an adder means for adding an output of said changing means to an output of said Y-axis position sensor, said Y-axis correction circuit advancing the phase of the output of said X-axis position sensor by 90 degrees with respect to the output of said Y-axis position sensor.

4,686,405

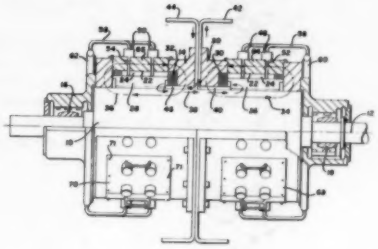
HOMOPOLAR DYNAMOELECTRIC MACHINE WITH EXTERNALLY ACTUATED BRUSHES

Bobby D. McKee, San Jose, Calif., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 29, 1986, Ser. No. 912,734

Int. Cl.[4] H02K *31/00*

U.S. Cl. 310—178 5 Claims



1. A homopolar dynamoelectric machine comprising:

a stator structure having an interior surface defining an internal space;

a generally cylindrical rotor having a central axis, being positioned within said internal space and being mounted for rotation with respect to said stator structure;

a plurality of brush assemblies positioned between said interior surface of said stator structure and an exterior surface of said rotor and capable of making electrical contact with said rotor exterior surface;

a plurality of brush drive rods extending through said stator structure in a generally radial direction, a first end of each of said rods being detachably connected to one of said brush assemblies;

a plurality of brush actuators positioned on an external surface of said stator structure, each of said brush actuators being connected to a second end of one of said rods, whereby said brush actuators control radial displacement of said brush assemblies; and

wherein the space between said interior surface of the stator structure and said exterior surface of said rotor is insufficiently wide in a radial direction to accommodate said brush assemblies and said brush actuators.

4,686,406

APPARATUS FOR APPLYING HIGH FREQUENCY ULTRASONIC ENERGY TO CLEANING AND ETCHING SOLUTIONS

Allen H. Meitzler, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 6, 1986, Ser. No. 927,625

Int. Cl.[4] H01L *41/08*

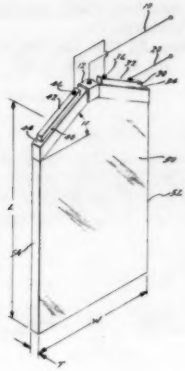
U.S. Cl. 310—322 6 Claims

1. An improved apparatus for communicating high frequency mechanical energy into a liquid medium comprising:

transducer means formed by elongated piezoelectric material responsive to a high frequency electrical signal for generating a high frequency mechanical vibration and located external to said liquid medium;

means formed by a mechanically elastic material having the opposing planar surfaces, parallel side edges and pair of

upper edges disposed at 45° angles to said side edges, with said transducer means bonded to its upper edges for transmitting said high frequency vibrations from said transducer means to said liquid medium.



4,686,407

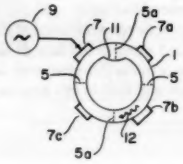
SPLIT MODE TRAVELING WAVE RING-RESONATOR

Peter H. Ceperley, 4803 Clemons Ct., Annandale, Va. 22003

Filed Aug. 1, 1986, Ser. No. 891,590

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—323 **14 Claims**



1. A split mode traveling wave ring resonator comprising:

A. a ring resonator means including at least one perturbation means in the characteristic impedance around the ring, such that the ring resonator has two standing wave resonant modes; one of these modes shifted around said ring resonator means from the other, and having resonant frequencies of approximately $f_s + \frac{1}{2}\Delta f_1$ and $f_s \frac{1}{2}\Delta f_2$, where f_s is the operating frequency of the resonator and Δf_1 and Δf_2 are the half power bandwidths of these first and second standing wave modes respectively; all other standing wave modes of the ring resonator are essentially non-overlapping with f_s and

B. at least one wave generating means coupled with the ring resonator, said wave generating means all being of about the same phase and positioned around the ring approximately equidistant from two adjacent standing wave maxima, one a maxima of one of the modes and one of the other mode, the wave generating means constructed to couple wave energy of frequency f_s to both modes of the resonator with roughly equal strength.

4,686,408

CURVILINEAR ARRAY OF ULTRASONIC TRANSDUCERS

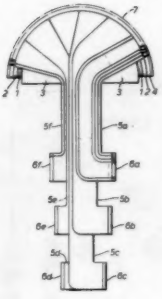
Kazufumi Ishiyama, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 679,058, Dec. 6, 1984, abandoned. This application Nov. 14, 1986, Ser. No. 930,993

Claims priority, application Japan, Dec. 8, 1983, 58-230670; Jun. 6, 1984, 59-114638

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—334 **5 Claims**



1. A convex array of ultrasonic transducers, comprising:

a base having a convex surface; and,

a flexible transducer assembly bonded to the convex surface of said base, including,

a flexible backing plate bent around said convex surface of said base and having an acoustic impedance the same as that of said base, said flexible backing plate having opposed sides, one of which is bonded to the convex surface of said base with an epoxy resin containing heavy metal powder to match the acoustic impedance of said base to said backing plate, and

an array of ultrasonic transducer elements disposed on the other side of said flexible backing plate, said array of transducer elements comprising a piezoelectric ceramic plate having opposed sides, electrode layers provided on the opposed sides of said piezoelectric ceramic plate, and a matching layer formed on a selected of said electrode layers, said array having grooves cut through said piezoelectric ceramic plate, said electrode layers, said matching layer and a portion of the flexible backing plate to define individual transducer elements and to isolate said individual transducer elements, and

a plurality of flexible printed circuit boards having electrical lead patterns sandwiched between said piezoelectric plate and said flexible backing plate and connected to respective of said transducer elements to supply drive pulses to said respective transducer elements.

4,686,409

POROUS ADAPTATION LAYER IN AN ULTRASONIC APPLICATOR

Hans Kaarmann, Buckenhof; Karl Lubitz, Ottobrunn; Jutta Mohaupt, Munich; Martina Vogt, Fürth, and Wolfram Wersing, Kirchheim, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 26, 1985, Ser. No. 759,559

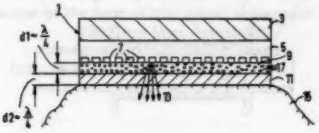
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1984, 3430161

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—358 **14 Claims**

1. In an ultrasonic transducer unit of the type which has a piezo-ceramic transducer, a first adaptation layer coupled to

the piezo-ceramic transducer and a second adaptation layer which is coupled to the first adaptation layer and an object to be examined, the improvement comprising a first adaptation layer of a porous piezo-ceramic material with a porosity selected such that when the first adaptation layer is one quarter wavelength thick at a nominal frequency of the piezo-ceramic transducer, the first adaptation layer has an acoustic impedance which is between the acoustic impedance of the piezo-ceramic transducer and the second adaptation layer.

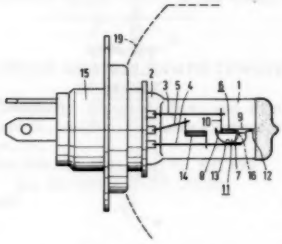


4,686,410

INCANDESCENT LAMP HAVING A REFLECTING SCREEN AND TONGUE

Michel Jacrot, Barjouville Chartres, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 23, 1985, Ser. No. 757,964
Claims priority, application France, Aug. 3, 1984, 84 12310
Int. Cl.[4] H01K *1/26*
U.S. Cl. 313—113 **8 Claims**



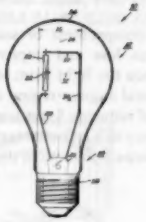
1. An electric incandescent lamp provided with
a tubular glass lamp vessel which is sealed in a gas-tight manner and has a seal at a first end;
current supply conductors entering the lamp vessel through said seal;
a helically wound filament which is longitudinally arranged in the lamp vessel and has at each of its ends a limb connected to a respective current supply conductor; and
an elongate concave reflecting screen in the lamp vessel, which extends along the filament whilst facing said filament with its concave side and which is curved substantially spherically at its end facing the said seal, has a vane extending longitudinally in the lamp vessel at is other end, and has a flat base portion,
characterized in that the screen is provided with a reflecting tongue which faces the filament throughout its length and moves gradually away from the flat base portion of the screen and extends towards the end of the filament remote from the seal of the lamp vessel.

4,686,411

INCANDESCENT LAMP HAVING AN IMPROVED AXIAL MOUNTING STRUCTURE FOR A FILAMENT

Robert W. Sands, Hudson, Ohio, assignor to General Electric Company, Schenectady, N.Y.

Filed Dec. 6, 1985, Ser. No. 805,668
Int. Cl.[4] H01J *1/88, 19/42;* H01K *1/18*
U.S. Cl. 313—271 **2 Claims**



1. An incandescent lamp comprising;
an outer envelope having a neck portion with a predetermined diameter;
an electrically conductive base connected to said neck portion;
a filament;
a mounting arrangement for spatially disposing said filament within said envelope in an axial manner off-set from the centerline of the lamp by an amount greater than one-half ($\frac{1}{2}$) of said neck diameter but less than the diameter of the neck portion, the mounting arrangement comprising;
an insulative stem member; and
a pair of conductive members with one being of length greater than the other, each of said conductive members having a first end respectively connected across said filament, the second end of each of said conductive members being appropriately connected to said electrically conductive base, said connected filament being separated from the portion of the longer conductive member which is parallel to said filament by a distance greater than one-half of said neck diameter but less than whole of said neck diameter
said filament separation from said portion of said longer conductive member being effective for reducing the arcing condition between said filament and said longer conductive member.

4,686,412

REFLECTOR-TYPE LAMP HAVING REDUCED FOCUS LOSS

Pierce Johnson, Jr., Topsfield, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Apr. 14, 1986, Ser. No. 852,002
Int. Cl.[4] H01J *1/16, 19/10;* H01K *1/14*
U.S. Cl. 313—344 **14 Claims**

1. A reflector-type electric lamp having reduced focus loss including a reflector member, having a central angular region, a light source disposed within said reflector member, the improvement wherein said light source comprises:
a hermetically sealed light transmissive envelope;
means for structurally and electrically mounting a filament within said envelope; and
a refractory metal coiled coil filament electrically coupled to and supported by said means for mounting wherein the primary winding diameter D_1 and the secondary winding diameter D_2 of said filament are:

$$D_1 = d(A + 2) \quad \text{and}$$

-continued

$$D_2 = D_1(B + 2)$$

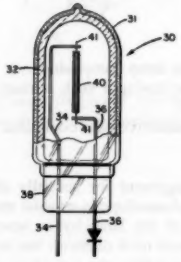
wherein:

d = the filament wire diameter

$$1.70 \leqq A \leqq 4.00 \; B \geqq A$$

such that the compactness of said filament provides for reduced focus loss and improved reflector collection efficiency since the light from said filament is channeled into said central angular region of said reflector member.

14. A method of reducing focus loss and increasing reflector collection efficiency in a reflector type lamp, said lamp having a reflector member, a light source disposed within said reflector member and a lens member adjacent said reflector member, said method comprising the steps of:



providing a strand of fibrous filament wire having a particular length L and diameter d for a particular wattage, voltage and efficacy;

winding said filament wire around a primary mandrel having a diameter M_1, determined by $M_1 = A(d)$, to produce a primary coil, wherein $1.70 \leqq A \leqq 4.00$;

winding said primary coil around a secondary mandrel having a secondary mandrel diameter M_2 determined by $M_2 = B(M_1 + 2d)$, to produce a coiled coil configuration, where $B \geqq A$;

removing substantially all of the core of said coiled coil filament;

mounting said filament axially within the longitudinal axis of an envelope to form said light source; and

disposing said light source within the central angular region of said reflector member.

4,686,413

CATHODE FOR MAGNETRON

Yoshihiko Sato, Kunitachi, and Nobuaki Yamamoto, Musashimurayama, both of Japan, assignors to New Japan Radio Co., Ltd., Tokyo, Japan

Division of Ser. No. 910,262, Sep. 16, 1986, abandoned, which is a continuation of Ser. No. 823,866, Jan. 29, 1986, abandoned. This application Dec. 17, 1986, Ser. No. 942,955

Claims priority, application Japan, Feb. 6, 1985, 60-21379

Int. Cl.[4] H01J *1/13, 25/50*

U.S. Cl. 313—346 R **7 Claims**

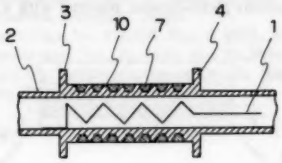
1. A method of manufacturing a cathode for a magnetron comprising the steps in sequence of:

(a) preparing a solid nickel rod to form a cathode sleeve,

(b) cutting the rod so that the outer shape of a portion whereat a plurality of isolated projections are formed has a prescribed diameter,

(c) forming a plurality of isolated projection by cutting the cut portion of the rod with a knurling tool,

(d) hollowing out the center of the rod to form a hollow portion into which a heater is inserted, and



(e) filling electron emissive material within gaps among the plural projections.

4,686,414

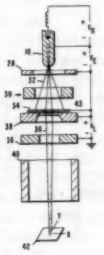
ENHANCED WETTING OF LIQUID METAL ALLOY ION SOURCES

Charles M. McKenna, Boxford, Mass.; Irwin R. Sharapata, Canoga Park, and William M. Clark, Jr., Thousand Oaks, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 20, 1984, Ser. No. 673,465

Int. Cl.[4] H01J *27/02, 37/08*

U.S. Cl. 313—362.1 **23 Claims**



1. A process for preparing an evaporation element of enhanced wettability used in liquid metal ion sources to evaporate an ion source alloy at an operating temperature, comprising the steps of:

selecting a coating material, the coating material being selected to wet the evaporation element at a temperature greater than the operating temperature of the liquid metal ion source alloy, to be wet by the source alloy at the operating temperature, and to not increase substantially the melting point of the source alloy when dissolved therein;

coating the evaporation element with the coating material at a coating temperature sufficiently high so that a liquid layer is formed adjacent the surface of the evaporation element; and

contacting the ion source alloy to the coated evaporation element at about the operating temperature to establish a first wetted layer of the ion source alloy on the evaporation element.

4,686,415

TENSED MASK COLOR CATHODE RAY TUBE AND MASK SUPPORT FRAME THEREFOR

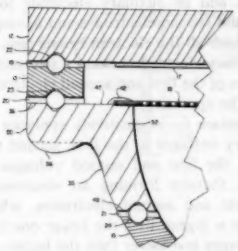
Paul Strauss, Chicago, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Apr. 30, 1985, Ser. No. 729,015

The portion of the term of this patent subsequent to Oct. 15, 2002, has been disclaimed.

Int. Cl.[4] H01J *29/07, 29/86*

U.S. Cl. 313—402 **7 Claims**



1. An annular support frame for a flat face panel for a cathode ray tube adapted to support a tensed mask within the tube, with a precise spacing between the panel and the tensed mask, and for forming an integral portion of the envelope of the completed tube, said support frame comprising:

continuous flange means having a seal surface for joining to the periphery of the flat panel;

shelf means inwardly disposed from the flange means and providing a support surface for the edges of the tensed mask; and

skirt means extending axially rearwardly from the shelf means and including a seal end for joining to a funnel portion of the tube envelope, said skirt means lending stiffness to said support frame to enable said support frame to resist distortion by the tension in said tensed mask.

4,686,416

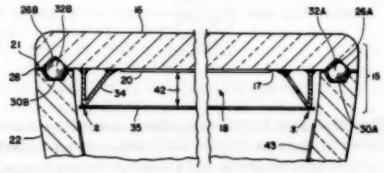
COLOR CRT FRONT ASSEMBLY WITH TENSION MASK SUPPORT

Lawrence W. Dougherty, Sleepy Hollow, and Paul Strauss, Chicago, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Filed Feb. 21, 1986, Ser. No. 831,699

Int. Cl.[4] H01J *29/07, 29/88*

U.S. Cl. 313—407 **9 Claims**



1. A front assembly for a color cathode ray tube including a faceplate having on its inner surface a centrally disposed screen area for receiving process coating materials during a spin-application process, said front assembly having a shadow mask support structure secured to said inner surface on opposed sides of said screen area, said mask support structure having a first surface for receiving and securing a foil shadow mask and a second surface inclined from said first surface to said screen area effective to conduct from said screen area any excess of coating material applied during the spin-application process, thereby avoiding discontinuities in phosphor application visible to the viewer, and non-adherence of phosphor resulting in phosphor wash-off and flake-off.

4,686,417

X-RAY IMAGE INTENSIFIER

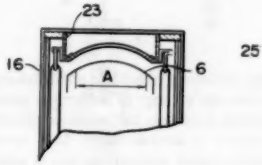
Takashi Noji, Odawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 26, 1985, Ser. No. 705,728

Claims priority, application Japan, Feb. 29, 1984, 59-36245

Int. Cl.[4] H01J *31/49;* **G21C** *11/00*

U.S. Cl. 313—479 **15 Claims**



1. An X-ray image intensifier apparatus, comprising:

an input window on an input side of said apparatus, said input window adapted to have x-rays incident thereupon;

an input screen opposing the input window; and

means for X-ray shielding, comprising a resin in which a particulate material having X-ray shielding and absorbing effects is dispersed, provided on a peripheral portion of said input side of said X-ray image intensifier apparatus and having an incident surface, adjacent to an area of X-ray incidence, and a peripheral surface, facing away from said incident surface, an area of said incident surface having a lower density of said particulate material than an area of said peripheral surface.

4,686,418

PLATE-SHAPED DISPLAY STRUCTURE

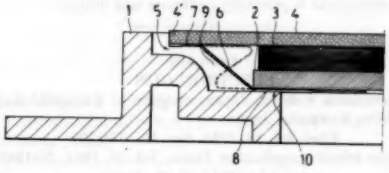
Tapio Tuomainen, Virkkala, Finland, assignor to Oy Lohja AB, Virkkala, Finland

Filed May 30, 1985, Ser. No. 739,200

Claims priority, application Finland, Jun. 7, 1984, 842309

Int. Cl.[4] H05B *33/04*

U.S. Cl. 313—512 **4 Claims**



1. A plate-shaped display structure, in particular an electroluminescent display structure, which comprises a frame; a printed-circuit plate supported on the frame, which plate is provided with first contact areas; a display plate, preferably made of glass, which is fitted onto the printed-circuit plate, with a spacing being provided therebetween, and which is provided with second contact areas; a fastening structure for attaching the display plate and the printed-circuit plate to each other;

wherein said fastening structure comprises a so-called two-sided resilient tape provided intermediate the printed-circuit plate and the display plate to cause said plates to adhere to each other, and wherein the display plate and the frame are dimensioned in such a way that they do not make contact with each other.

4,686,419

COMPACT HIGH-PRESSURE DISCHARGE LAMP WITH A FILL INCLUDING CADMIUM AND LITHIUM HALIDE

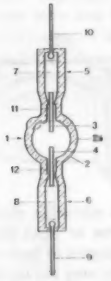
Werner Block, Taufkirchen; Wolfgang Pabst, and Manfred Pilsak, both of Munich, all of Fed. Rep. of Germany, assignors to Patent Treuhand Gesellschaft fur elektrische Gluhlampen mbH, Munich, Fed. Rep. of Germany

Filed Feb. 13, 1986, Ser. No. 829,413

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1985, 3506295

Int. Cl.[4] H01J *61/20, 61/38*

U.S. Cl. 313—641 **12 Claims**



1. A compact high-pressure discharge lamp (**1**, **14**), particularly for illumination within an optical system, having

a single, uncovered bulb comprising a discharge vessel (**2**, **28**) of high-temperature resistant optically transparent material and forming a single arc retention vessel;

two electrodes (**3**, **4**; **21**, **22**) of high-temperature resistant material leaving a short arc-gap therebetween to define, with the single bulb, a short-arc lamp; and

a fill within the vessel comprising the fill components of: mercury, at least one noble gas, a mercury halide, and an excess of halogen, wherein the halogen consists of at least one of: iodine, bromine,

and comprising,

means for obtaining an average illumination density in excess of 30 ksb with a specific arc power between about 400–5000 W/cm, with a color rendition index Ra of at least 85 over an average lifetime of the lamp of 250 hours which is characterized by the fill further comprising metal halide components in which the metal of the metal halide components is primarily cadmium and lithium.

4,686,420

ELECTRON GUN

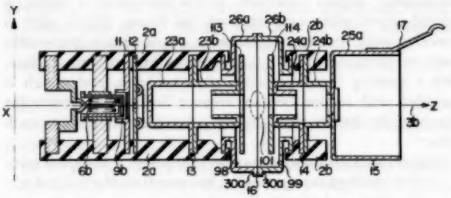
Eiji Kamohara, Fukaya, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 18, 1985, Ser. No. 756,299

Claims priority, application Japan, Jul. 26, 1984, 59-154008

Int. Cl.[4] H01J *29/46, 29/56*

U.S. Cl. 315—15 **5 Claims**



1. An electron gun for producing and directing at least one electron beam along a beam path, said electron gun comprising:

beam forming means for generating a plurality of electron beams, the beam paths of the electron beams being within the same beam plane;

main lens means for focusing the electron beams, the main lens means including first and second electrodes arranged along the beam paths and respectively having opposite surfaces facing each other, each electrode having apertures through which the electron beams pass, respectively, the number of apertures being the same as the number of electron beams, and an auxiliary electrode located between the first and second electrodes and having an aperture through which all the electron beams pass, the aperture of the auxiliary electrode having a size such that the opposite surfaces of the first and second electrodes can be located within the aperture;

voltage applying means for respectively applying first, second and auxiliary voltages to the first, second and auxiliary electrodes, the first and second voltages being of different levels, thereby forming an electrostatic field between the first and second electrodes, wherein the auxiliary voltage is higher than the lower one of the first and second voltages and lower than the higher one; and

correcting means for correcting the electrostatic field formed between the first and second electrodes, said correcting means including a correcting electrode disposed close to the opposite surface of at least one of the first and second electrodes, wherein said correcting means receives the same voltage as the voltage applied to said one electrode.

4,686,421

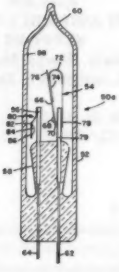
GLOW DISCHARGE STARTER AND ARC DISCHARGE LAMP CONTAINING SAME

John A. Scholz, Danvers, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed May 30, 1985, Ser. No. 739,347

Int. Cl.[4] H01J *61/52*

U.S. Cl. 315—73 **11 Claims**



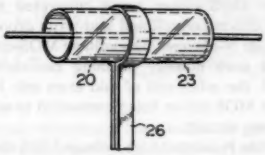
1. A glow discharge starter comprising an envelope having a seal located at one end thereof and containing an ionizable medium, a bimetallic electrode and a counter electrode located within said envelope, said electrodes defining a cylindrically shaped area therebetween extending longitudinally within said envelope from said seal to the other end of said envelope, and a getter holder located external to said area and secured to one of said electrodes and being adjacent the internal surface of said envelope, said getter holder comprising a getter holder strip having a getter cup formed therein or secured thereto for holding a predetermined amount of getter material, said getter cup having an opening and said opening faces said internal surface of said sealed envelope in a direction away from said bimetallic electrode.

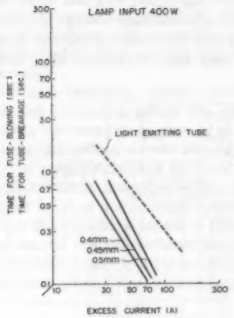
4,686,422

HIGH-PRESSURE METAL VAPOR DISCHARGE LAMP WITH CHARACTERISTIC FUSE ACTION

Akira Ito; Yuji Danno, and Kouzou Kawashima, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 3, 1985, Ser. No. 730,129
Claims priority, application Japan, May 4, 1984, 59-64797[U]; Jun. 11, 1984, 59-118197
Int. Cl.[4] H01J 7/44, 13/46, 17/34
U.S. Cl. 315—74 6 Claims





1. A high-pressure metal vapor discharge lamp comprising:
an outer tube,
a light emitting tube located within the outer tube and made of a light-transmissive ceramics material and having electrodes sealed at opposite ends thereof, and
a fuse electrically connected in series with the light emitting tube and positioned within the outer tube,
in which said fuse has such a blowing characteristic as given by the following equation and (at a rated output during the lighting of the lamp the density of a current through the fuse is not more than 23.9 A/mm^{2}the density of a current through the fuse at a rated output during the lighting of the lamp is not more than 23.9 A/mm^2.

$\log T_1 < A \log I + B$ wherein,

$A = -1.02 \times 10^{-2}(D^2t) - 0.885$

$B = 2.64 \times 10^{-2}(D^2t) + 1.01$,

T1: required blowing time (seconds) of the fuse,
I : blowing current (A) of the fuse,
D : inner diameter (mm) of the light emitting tube, and
t : wall thickness (mm) of the light emitting tube.

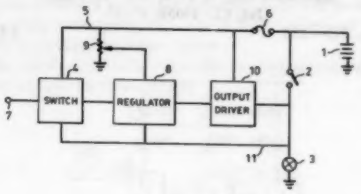
4,686,423

AUTOMOTIVE HEADLIGHT CONTROL

Christopher A. Eydt, Hamilton, Canada, assignor to Safety Solutions Co. Inc., Hamilton, Canada

Filed Feb. 26, 1986, Ser. No. 833,089
Int. Cl.[4] B60Q 1/02
U.S. Cl. 315—82 5 Claims

1. An automotive headlight control system for an automobile having an engine, a battery, charging means for said battery driven by the said engine, headlights operated from a terminal of said battery said control system including a switch responsive to a comparison of the voltage at the automobile said battery terminal to a reference voltage, a regulator having a selectable output which output is controlled by said switch, a current control device for supplying current to said head-



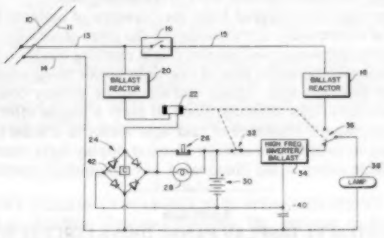
lights of the automobile from said battery terminal, said current control device being controlled in turn by the said output of said regulator whereby a controlled current is supplied to said headlights whenever said switch detects a voltage above a predetermined value at said automobile battery terminal.

4,686,424

EMERGENCY LIGHTING CIRCUITS

Joe A. Nuckolls, Blacksburg, and Kerry G. Evans, Christiansburg, both of Va., assignors to Harvey Hubbell Incorporated, Orange, Conn.

Filed Jan. 21, 1986, Ser. No. 820,723
Int. Cl.[4] H05B 37/00
U.S. Cl. 315—86 9 Claims

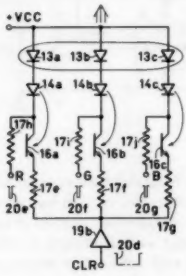


1. An emergency lighting circuit for keeping a lamp energized in the absence of power line voltage comprising
a discharge lamp;
a high frequency inverter circuit having an input and an output;
first circuit means for supplying power to said lamp from one of said output of said inverter circuit and said power lines supplying the line voltage;
a normally closed contact set;
a rechargeable battery connected to said input of said inverter circuit through said contact set; and
a full wave rectifier, a ballast reactor and a relay winding connected in series circuit relationship with said battery across said power lines, said relay operating said contact set so that when line voltage is present said relay is energized and said battery is charged with said contact set open, energizing said lamp through said first circuit means from said power lines and so that failure of line voltage causes said relay to be deenergized, closing said contact set and resulting in inverter operation of said lamp.

4,686,425
MULTICOLOR DISPLAY DEVICE

Karel Havel, P.O. Box 66, Station M, Toronto, Ontario, Canada M6S 4T2

Continuation-in-part of Ser. No. 856,196, Apr. 28, 1986. This application Aug. 4, 1986, Ser. No. 892,837
Int. Cl.[4] H05B *37/02*
U.S. Cl. 315—152 **2 Claims**



1. A multicolor display device comprising:

three display light emitting diodes for emitting upon activation light signals of respectively different primary colors, each said display light emitting diode being capable either of an illuminated or extinguished condition;

means for blending said light signals to obtain a composite light signal of a color in accordance with the condition of respective display light emitting diodes;

three auxiliary light emitting diodes respectively electrically coupled to said display light emitting diodes, thereby forming three pairs of associated display light emitting diode and auxiliary light emitting diode;

three light sensors respectively electrically serially coupled to said pairs of associated display light emitting diode and auxiliary light emitting diode, each said light sensor having resistance variable with illumination; and

three chambers secured from the presence of ambient light for respectively accommodating the pairs of serially coupled light sensor and auxiliary light emitting diode, in each said pair the active area of said light sensor being oriented to intercept light signals emitted by its serially coupled auxiliary light emitting diode to exert a toggle effect by varying the resistance of said light sensor in a sense tending to maintain its serially coupled display light emitting diode either in the illuminated or extinguished condition.

4,686,426
THIN-FILM EL DISPLAY PANEL DRIVE CIRCUIT WITH VOLTAGE COMPENSATION

Yoshihide Fujioka; Shigeyuki Harada; Toshihiro Ohba; Yoshiharu Kanatani, all of Nara, and Hisashi Uede, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 26, 1985, Ser. No. 780,177
Claims priority, application Japan, Sep. 28, 1984, 59-205428
Int. Cl.[4] H01Q *19/14*
U.S. Cl. 315—169.3 **6 Claims**

5. A drive system for a thin-film electroluminescent (EL) matrix display panel comprising:

data side electrodes formed on one major surface of the thin-film electroluminescent (EL) matrix display panel and generally extending in a first direction;

scanning side electrodes formed on the opposing major surface of said thin-film electroluminescent (EL) matrix display panel in a second direction substantialiy perpendicular to said first direction, said scanning side electrodes being alternately divided into odd number scanning electrodes and even number scanning electrodes;

a pull-up charge driving circuit;

a precharge driving circuit;

a write driving circuit for providing first and second write pulses;

a source level switching circuit;

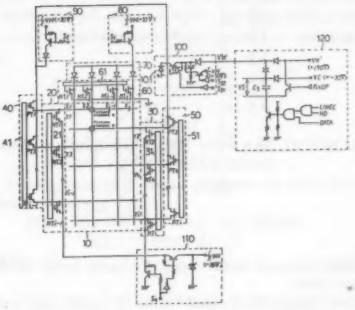
an odd side N-channel high voltage MOS driver connected to said odd number scanning electrodes at one end thereof, the other end of said odd side N-channel high voltage MOS driver being connected to said source level switching circuit;

an odd side P-channel high voltage MOS driver connected to said odd number scanning electrodes at one end thereof, the other end of said odd side P-channel high voltage MOS driver being connected to said pull-up charge driving circuit and said write driving circuit;

an even side N-channel high voltage MOS driver connected to said even number scanning electrodes at one end thereof, the other end of said even side N-channel high voltage MOS driver being connected to said source level switching circuit;

an even side P-channel high voltage MOS driver connected to said even number scanning electrodes at one end thereof, the other end of said even side P-channel high voltage MOS driver being connected to said pull-up charge driving circuit and said write driving circuit; and

a data side N-channel high voltage MOS driver connected to said data side electrodes at one end thereof, the other end of said data side N-channel high voltage MOS driver



being connected to said precharge driving circuit; said MOS drivers collectively driving said data side electrodes add said scanning side electrodes to define a number of emitting elements;

detecting means for detecting the number of emitting elements for each scan side emitting line in a first driving period;

voltage compensating means connected to said write driving circuit for compensating for voltage drops in said odd and even side P-channel high voltage MOS drivers by adding a voltage in a second driving period to said second write pulse based upon the variations in the number of emitting elements detected in said first driving period;

said odd side P-channel MOS driver providing said first write pulse to said odd number scanning electrodes when an even number scanning electrode is selected in said first driving period and providing said second write pulse to a selected odd number scanning electrode when in said second driving period;

said even-side P-channel MOS driver providing said first write pulse to said even number scanning electrodes when an odd number scanning electrode is selected in said first driving period and providing said second write pulse to a selected even number scanning electrode in said second driving period;

said first write pulse provided being of a polarity opposite to said second write pulse which is provided.

4,686,427

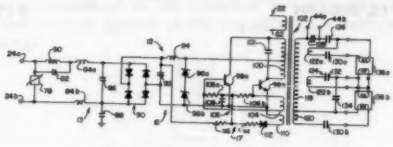
FLUORESCENT LAMP DIMMING SWITCH

Robert V. Burke, Fort Wayne, Ind., assignor to MagneTek, Inc., Encino, Calif.

Continuation-in-part of Ser. No. 765,313, Aug. 13, 1985, abandoned. This application Dec. 19, 1986, Ser. No. 945,223

Int. Cl.[4] H05B *37/02*

U.S. Cl. 315—219 **14 Claims**



1. In an electronic fluorescent lamp ballast of the type having an oscillator with an output transformer and first and second reactances in series with a secondary winding of the output transformer wherein the reactances are reflected back to the oscillator to affect the oscillator frequency, with the first reactance having sufficient capacitive impedance to limit the ionization current of a fluorescent lamp load and with the second reactance of sufficient impedance to affect the operating frequency of the oscillator, the improvement in combination therewith comprising:

bi-directional solid state switching means operable by an electrical signal and connected across the second reactance to change the operating frequency of the ballast by selectively shunting alternating current around the second reactance when the switching means is closed, such that:

(i) the first reactance limits lamp ionization current to a relatively higher level at a relatively lower operating frequency when the switching means is closed; and

(ii) the first and second reactances limit lamp ionization current to a relatively lower level at a relatively higher operating frequency when the switching means is open.

4,686,428

HIGH INTENSITY DISCHARGE LAMP SELF-ADJUSTING BALLAST SYSTEM WITH CURRENT LIMITERS AND A CURRENT FEEDBACK LOOP

Donald S. Kuhnel, Houston, and Sidney A. Ottenstein, Spring, both of Tex., assignors to Innovative Controls, Incorporated, Houston, Tex.

Continuation-in-part of Ser. No. 770,663, Aug. 28, 1985. This application Jun. 18, 1986, Ser. No. 875,724

Int. Cl.[4] G05F *1/00;* **H05B** *37/02, 39/04, 41/36*

U.S. Cl. 315—307 **6 Claims**

1. A self-adjusting ballast system for mercury vapor, high intensity discharge lamps having outputs of 100 watts or greater, comprising:

a direct current source;

a lamp circuit containing a lamp;

a high frequency oscillator;

a current feedback means for sensing the current present in said lamp, comparing said current with a reference value, and outputting an output signal;

a pulse width modulator responsive to said output signal of said current feedback means;

a DC to AC converter that by control of at least one switch converts current of one voltage from said direct current source to alternating current of a different or the same voltage, said converter including a switch driving means for driving the at least one switch, said converter being responsive to said high frequency oscillator and to said pulse width modulator; and

means for sensing the current being supplied to said lamp and for quickly limiting the current to a predetermined safe level if too much current is being supplied to said lamp.

2. A self-adjusting ballast system for mercury vapor, high intensity discharge lamps having outputs of 100 watts or greater, comprising:

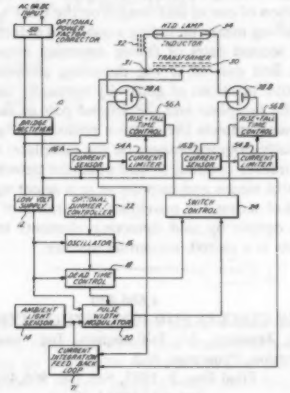
a direct current source;

a lamp circuit containing a lamp;

a high frequency oscillator;

a current feedback means for sensing the current present in said lamp, comparing said current with a reference value, and outputting an output signal;

a pulse width modulator responsive to said output signal of said current feedback means;



a DC to AC converter that by control of at least one switch converts current of one voltage from said direct current source to alternating current of a different or the same voltage, said converter including a switch driving means for driving the at least one switch, said converter being responsive to said high frequency oscillator and to said pulse width modulator; and

means for detecting that the current across said lamp is travelling in only a single direction and for limiting the current to said lamp to a predetermined safe level if too much current is being supplied to said lamp.

4,686,429

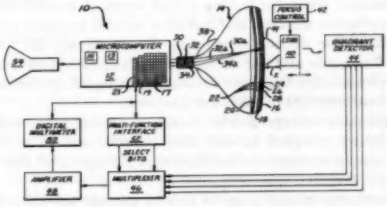
CRT COLOR CONVERGENCE MEASUREMENT

James R. Fendley, Arlington Heights, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Dec. 11, 1985, Ser. No. 808,302

Int. Cl.[4] H01J *29/70;* **H04N** *9/24*

U.S. Cl. 315—368 **8 Claims**



1. In a color CRT wherein a plurality of electron guns each direct a respective electron beam onto a plurality of discrete luminescent elements positioned in an ordered array on a faceplate in producing video images thereon, a system for measur-

ing the convergence of said electron beams on the faceplate comprising:

control means coupled to each of said electron guns for directing the plurality of electron beams onto the faceplate in timed sequence so as to produce a plurality of images in the form of lines or other patterns thereon;

a lens positioned adjacent to and forward of the CRT's faceplate for receiving and transmitting the plurality of images displayed on the faceplate;

detecting means aligned with said lens for receiving said images transmitted by said lens, for detecting the relative positions of each of said line or other pattern images, and for generating a plurality of signals each representing the position of one of said images on the CRT's faceplate, said detecting means including a quadrant detector having first and second pairs of facing detecting elements, wherein said first pair of facing detecting elements detects the relative positions of generally vertically oriented images on the faceplate and the second pair of facing detecting elements detects the relative positions of generally horizontally oriented images on the faceplate; and

a multiplexer coupled to said quadrant detector and to said control means and responsive to a select signal from said control means for providing a plurality of detection signals output by said detecting elements to said control means in a paired, sequential manner.

4,686,430

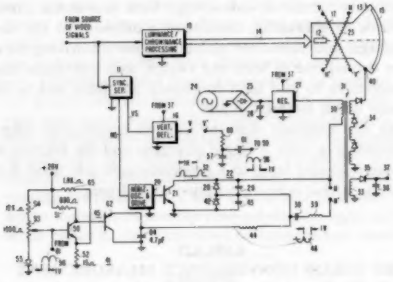
DRIVE CIRCUIT FOR PINCUSHION CORRECTOR

James R. Jennings, Jr., Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Dec. 5, 1985, Ser. No. 805,492

Int. Cl.[4] H01J *29/56*

U.S. Cl. 315—371 **6 Claims**



1. Means for correcting side pincushion distortion in a video display apparatus comprising:

a first transistor having base, emitter and collector terminals;

a source of periodically field-rate varying input signals coupled to said base terminal;

a second transistor having a first terminal coupled to said collector temrinal and having a second terminal coupled to a line deflection winding for modifying the current flowing in said line deflection winding in response to said periodically field-rate varying input signal applied to said base terminal of said first transistor;

adjustable voltage divider means, including semiconductor means, coupled to said base terminal and to a voltage supply terminal for establishing a voltage level bias point for said first transistor; and

impedance means coupled to said emitter terminal and to said voltage supply terminal for increasing the voltage level of said bias point of said first transistor to enable said first transistor to be rendered nonconductive at a predetermined adjustment point of said adjustable voltage divider means.

4,686,431

LINE OUTPUT CIRCUIT FOR GENERATING A LINE FREQUENCY SAWTOOTH CURRENT

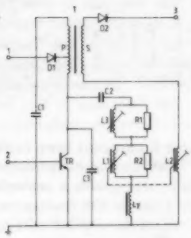
Dennis C. F. Skelton, Wallington, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 16, 1985, Ser. No. 788,181

Claims priority, application United Kingdom, Oct. 19, 1984, 8426422

Int. Cl.[4] H01J *29/70*

U.S. Cl. 315—399 **5 Claims**



1. A line output circuit for generating a line frequency sawtooth current having a scan period and a flyback period through a line deflection coil for deflecting an electron beam in a cathode ray display tube, said circuit comprising the series arrangement of a line deflection coil and a trace capacitor which series arrangement is connected across the terminals of a controlled switch, a flyback capacitor also being connected across the terminals of said controlled switch, one terminal of the controlled switch being additionally connected to the primary winding of a transformer which winding is additionally connected to a supply terminal for a source of direct voltage, said transformer having a secondary winding one end of which is connected to a rectifier for generating, during the flyback period, the EHT supply for the final anode of a display tube, the circuit being tuned during the flyback period to a fundamental frequency and an odd harmonic thereof with the flyback period substantially corresponding to the duration of a half-cycle at the fundamental frequency, said controlled switch being conducting during the scan period and being rendered non-conducting at the end of the scan period to initiate the flyback period, characterised in that said circuit additionally comprises a first variable inductor included in said series arrangement for varying the width of the line scan on display and a second variable inductor connected in series with a winding of said transformer, the adjustment providing a variation in the inductance of said first inductor being ganged with that for the second conductor and arranged such that as the inductance of the first inductor is increased, the inductance of the second inductor is also increased and vice versa, whereby an alteration in the desired relationship between the said odd harmonic and the flyback period produced by a change in the inductance of said first inductor is substantially compensated for by the simultaneous change in the inductance of said second inductor.

4,686,432

VERTICAL DEFLECTION CIRCUIT FOR ELECTRON BEAMS IN PICTURE TUBES

Pierre-Axel Berland, Villingen-Schwenningen, and Jean-Claude Rufray, Brigachtal, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany

Filed Nov. 1, 1985, Ser. No. 794,078

Claims priority, application Fed. Rep. of Germany, Nov. 2, 1984, 3440024

Int. Cl.[4] H01J *29/70, 29/76*

U.S. Cl. 315—403 **20 Claims**

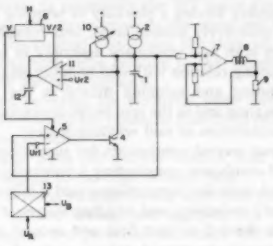
1. A circuit for inducing a vertical deflection of electron beams in picture tubes comprising

a capacitor;

a counter circuit for counting lines of a screen picture and producing a control signal;

an electronic switch connected to the counter circuit and to the capacitor for periodically discharging the capacitor after a vertical deflection period triggered by the control signal of the counter circuit;

a first comparator circuit connected to the counter circuit and activated by a signal from the counter circuit and further connected to the capacitor for comparing the actual voltage applied at the capacitor to a reference voltage;



a vertical deflection output stage having an input connected to the capacitor;

a constant current source connected to the capacitor for charging the capacitor with a charging current to provide a control signal for the vertical deflection output stage; and

a controllable current source connected in parallel relative to the constant current source for controlling the charging current of the capacitor such that the voltage of the capacitor corresponding to the center of the picture screen is maintained at a constant value.

4,686,433

MOTOR-DRIVEN POWER BOOSTER

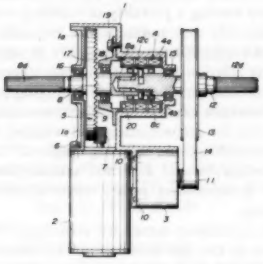
Yasuo Shimizu, Tochigi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 1, 1985, Ser. No. 794,012

Claims priority, application Japan, Nov. 2, 1984, 59-231757

Int. Cl.[4] B62D *5/04*

U.S. Cl. 318—50 **7 Claims**



1. A motor-driven power booster comprising:

a casing;

input and output shafts rotatably supported on said casing;

a first motor for driving said output shaft;

a second motor for driving said input shaft;

detecting means operatively cooperating with said input and output shafts for generating an output signal dependent on angular positions of said input and output shafts; and

electric circuit means for supplying electric power to said first motor to apply an output torque to said output shaft in response to the output signal from said detecting means and for supplying electric power to said second motor to apply a reactive torque to said input shaft in response to the electric power supplied to said first motor.

4,686,434

ELECTRIC VEHICLE MONITORING SYSTEM

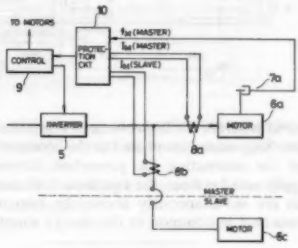
Shigeru Kojima, and Hideo Obi, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 7, 1986, Ser. No. 837,240

Claims priority, application Japan, Mar. 14, 1985, 60-50953; May 14, 1985, 60-100545

Int. Cl.[4] B61C *15/08*

U.S. Cl. 318—52 **6 Claims**



1. A system for monitoring one or more electric vehicles which are driven by a plurality of parallel-connected induction motors controlled by a variable voltage/variable frequency inverter, said induction motors being divided into a first group of one or more induction motors and a second group of one or more induction motors, comprising: rotational frequency detecting means for detecting a rotational frequency of said first group of motors;

first current detecting means for detecting a first motor current supplied to said first group of motors;

second current detecting means for detecting a second motor current supplied to said second group of motors; and

protection circuit means responsive only to outputs of said rotational frequency detecting means and said first and second current detecting means for determining an operational parameter of said second group of motors indicative of a rotational frequency of said second group of motors.

4,686,435

ELECTROMAGNETIC LINEAR DRIVE

Götz Heidelberg, Am Hügel 16, D-8130 Starnberg-Percha; Andreas Gründl, Haseneystrasse 20, D-8000 München 70, and Peter Rosner, Waltherstrasse 2, D-8000 München 2, all of Fed. Rep. of Germany

Filed Sep. 5, 1984, Ser. No. 647,708

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1983, 3331950

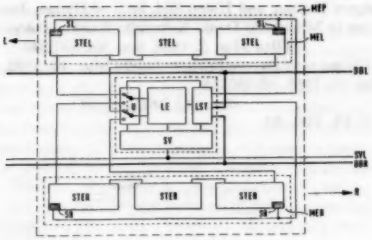
Int. Cl.[4] H02K *41/03*

U.S. Cl. 318—135 **6 Claims**

1. An electromagnetic linear drive including:

a first stator which constitutes a path of movement for a first running direction and a second stator which extends substantially parallel to the first stator and constitutes a path of movement for the opposite running direction, each of the two stators being provided with current conductors, and also including a first movable part which constitutes a first vehicle associated with the first stator, and a second movable part which constitutes a second vehicle associated with the second stator, each stator being divided into a number of motor elements and individual energy supply units the individual supply units being adapted to be switched on and off individually and associated with the

individual motor elements, and each energy supply unit being associated with a motor element of the one path of movement and the opposed motor element (MER) of the other path of movement and being connectable to the motor element of the one path of movement or the motor element (MER) of the other path of movement, as required wherein the improvement comprises a changeover switching means connected to the common energy supply unit for alternating the power of the common energy supply unit between the two motor elements when vehicles are simultaneously above the two motor elements connected in common to the energy supply unit.

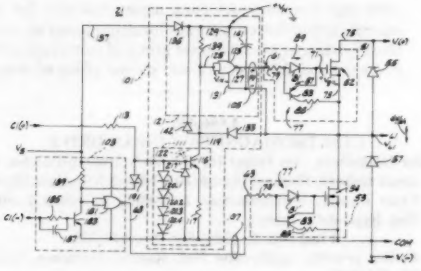


4,686,436

ELECTRONIC CONTROL CIRCUIT, ELECTRONICALLY COMMUTATED MOTOR SYSTEM AND METHOD FOR CONTROLLING SAME, LAUNDRY APPARATUS, AND METHODS FOR OPERATING APPARATUS FOR SWITCHING HIGH VOLTAGE DC AND FOR CONTROLLING ELECTRICAL LOAD POWERING APPARATUS

William R. Archer, Fort Wayne, Ind., assignor to General Electric Company

Filed Jul. 6, 1984, Ser. No. 628,224
Int. Cl.[4] H02P *6/02*
U.S. Cl. 318—254 **126 Claims**



1. For use in electrical load powering apparatus having a load connection, a high voltage supply connection and a common, and including electronic means for switching the high voltage supply connection to the load connection, the electronic switching means having an input and being responsive to a control voltage difference between the input and the load connection, the load connection being subject to high voltage excursions relative to common due to the switching, an electronic control circuit comprising:

active device circuit means for providing at least one pulse output relative to common and having at least one inherent capacitance;

inverting circuit means connected to the load connection for inverting the at least one pulse output of said active device circuit means to produce the control voltage difference between the electronic switching means input and the load connection; and

means for charging said at least one inherent capacitance of said active device circuit means for the high voltage supply connection when one of the high voltage excursions occurs.

20. Laundry apparatus comprising:

means operable generally in a laundering mode for agitating fluid and fabrics to be laundered therein and operable generally in spin mode for thereafter spinning the fabrics to effect centrifugal displacement of fluid from the fabrics;

an electronically commutated motor including a stationary assembly having a plurality of winding stages adapted to be selectively commutated, and rotatable means associated with said stationary assembly in selective magnetic coupling relation with said winding stages for driving said agitating and spinning means in the laundering mode operation and in the spin mode operation thereof upon the commutation of said winding stages;

first and second conductors for supplying power, said second conductor constituting a common; and

control units for commutating said winding stages by selectively switching said winding stages at respective terminals thereof to said first and second conductors in response to command pulses, each of said control units including:

electronic switching means for switching a respective said terminal to said first conductor, said electronic switching means having an input and being responsive to a control voltage difference between said input and said respective terminal, said respective terminal being subject to high voltage excursions relative to said common due to the switching;

active device circuit means for providing at least one pulse output relative to common in response to at least some of the command pulses and having at least one inherent capacitance;

inverting circuit means connected to said respective terminal for inverting the at least one pulse output of said active device circuit means to produce the control voltage difference between the input of said electronic switching means and said respective terminal; and

means for charging said at least one inherent capacitance of said active device circuit means when one of the high voltage excursions occurs.

63. An electronically commutated motor system comprising:

an electronically commutated motor including a stationary assembly having a plurality of winding stages adapted to be selectively commutated, and rotatable means associated with said stationary assembly in selective magnetic coupling relation with said winding stages;

first and second conductors for supplying power, said second conductor constituting a common; and

control units for commutating said winding stages by selectively switching said winding stages at respective terminals thereof to said first and second conductors in response to command pulses, each of said control units including:

electronic switching means for switching a respective said terminal to the first conductor, said electronic switching means having an input and being responsive to a control voltage difference between said input and said respective terminal, said respective terminal being subject to high voltage excursions relative to said common due to the switching;

active device circuit means for providing at least one pulse output relative to common in response to at least some of the command pulses and having at least one inherent capacitance;

inverting circuit means connected to said respective terminal for inverting the at least one pulse output of said active device circuit means to produce the control voltage differ-

ence between said electronic switching means input and said respective terminal; and

means for charging said at least one inherent capacitance of said active device circuit means from said first conductor when one of the high voltage excursions occurs.

70. A method of operating apparatus for switching high voltage (HV) direct current (DC) of a source thereof, the apparatus including electronic switch means having an input lead and first and second control leads with the first control lead being connected to the HV source and the HV source being returned to a common and with the HV electronic switch means adapted to change the voltage at the second control lead suddenly to essentially the HV upon the occurrence of a potential difference between the input and the second control lead, the method comprising the steps of:

providing an electrical pulse relative to the common, the electrical pulse having a duration;

level-shifting and inverting the electrical pulse away from the common to provide the potential difference relative to the second control lead;

deriving a voltage from the second control lead voltage when it is changing to the high voltage; and

substituting the derived voltage for the electrical pulse, and inverting the derived voltage and applying the inverted derived voltage as the potential difference between the input and the second control lead of the electronic switch means.

107. A method of operating apparatus for switching a first voltage from a source thereof, the apparatus including electronic switch means having an input lead and first and second control leads with the first control lead connected to the source and the source being returned to a common and a drive circuit means for producing a control voltage between the input and second control lead and the electronic switch means being adapted to change the voltage at the second control lead suddenly to essentially the first voltage upon the occurrence of said control voltage, the method comprising the steps of:

storing a voltage from a second supply voltage terminal in capacitor means so that the drive circuit means is able to be powered when the voltage at the second control lead is changed to essentially the first voltage;

sensing the voltage across said capacitor means; and

disabling the production of said control voltage difference upon the capacitor means voltage falling below a predetermined level when the second control lead voltage is essentially the first voltage so that the first voltage temporarily ceases and said capacitor means is able to be recharged from said second supply voltage terminal.

4,686,437

ELECTROMECHANICAL ENERGY CONVERSION SYSTEM

Lawrence W. Langley, and H. Keith Kidd, both of Christiansburg, Va., assignors to Kollmorgen Technologies Corporation, Dallas, Tex.

Continuation of Ser. No. 625,190, Jun. 28, 1984, abandoned, which is a continuation of Ser. No. 161,579, Jun. 20, 1980, abandoned. This application Sep. 17, 1986, Ser. No. 909,031

Int. Cl.[4] H02K *29/00*

U.S. Cl. 318—254 **23 Claims**

1. A motor control system comprising:

a brushless electric machine having field and wound members movable relative to each other, said wound member having a plurality of energizable windings;

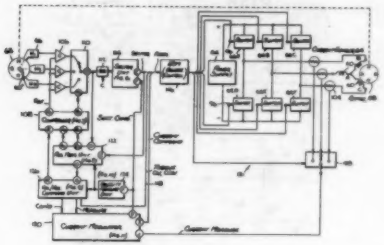
a position sensor associated with said motor to provide a position indication of relative position of said field and wound members;

switching means associated with said motor for measuring a controllable parameter of the motor operation;

a switching array including a plurality of solid state switching devices connected to selectively energize said windings;

a programmable microprocessor operatively connected to receive said position indications and said measured controllable parameter and to control said switching array; and

said microprocessor being programmed to determine the instantaneous on/off state for each of said switching devices



to energize said windings at a predetermined pulse energy level determined according to said measured controllable parameter, and

to commutate said winding energization according to said position indications.

4,686,438

ELECTRIC POWER STEERING APPARATUS

Takeshi Ohe; Yoshiaki Taniguchi, and Minoru Arai, all of Saitama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Mar. 6, 1986, Ser. No. 836,962

Claims priority, application Japan, Mar. 7, 1985, 60-43959

Int. Cl.[4] B62D *5/04;* **G05D** *17/02;* **H02P** *1/22*

U.S. Cl. 318—280 **5 Claims**

1. An electric power steering apparatus for causing a bridge circuit and a driver circuit to control normal and reverse operations of a motor, said bridge circuit comprising switching elements and having a first power input terminal, said driver circuit having a second power input terminal connected to a power source, said driver circuit being adapted to drive said bridge circuit, wherein a voltage drop element having a nonlinear current-to-voltage characteristic is connected between said power source and said first power input terminal such that a voltage at said first power input terminal is lower than that at said second power input terminal.

5. An electric power steering apparatus for controlling normal and reverse rotation operation of a motor comprising:

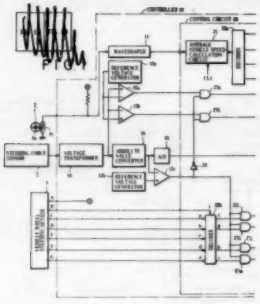
a power source;

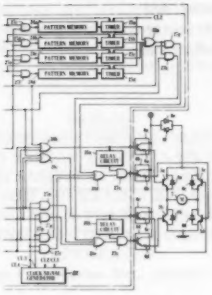
a bridge circuit comprising switch elements connected with said motor and a first power input terminal for receiving power from said power source;

a driver circuit which drives said bridge circuit and has a second power input terminal connected with said power source;

a first diode having one terminal connected with said power source and the other terminal connected with said first power input terminal so that a voltage at said first power input terminal is lower than that at said second power

input terminal by an amount corresponding to a forward-biased voltage drop component of said first diode; and





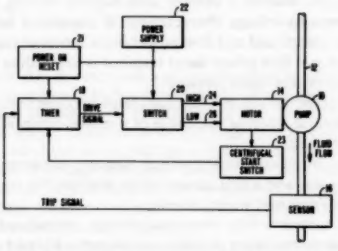
a second diode connected between said power source and said first power input terminal parallel to said first diode but with its polarity reversed.

4,686,439

MULTIPLE SPEED PUMP ELECTRONIC CONTROL SYSTEM

Robert L. Cunningham, Alamo; Charles R. Rhodes, Pleasant Hill; Carl Angotti, San Jose, and Paul H. Warner, San Francisco, all of Calif., assignors to A. T. Hunn Company, Oakland, Calif.

Filed Sep. 10, 1985, Ser. No. 774,512
Int. Cl.[4] G05B *5/00*
U.S. Cl. 318—335 **5 Claims**



1. A control system for two speed fluid pump having a first electrical power input for operation at a first low speed and a second electrical power input for operation at a second, high speed, comprising:

means for automatically sensing one of a rate of flow and a pressure of a fluid expelled from said pump and providing a trip signal at a predetermined value of one of said rate of flow and pressure;

an oscillator;

a counter having a clock input coupled to said oscillator, a reset input coupled to said sensing means, and an output;

a relay for selectively coupling said first and second electrical power inputs to a power supply, said relay having a winding coupled at a first end to a second power supply; and

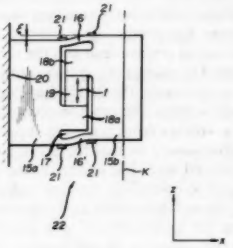
a drive transistor having a collector coupled to a second end of said winding, an emitter coupled to ground, and a base coupled to said output of said counter.

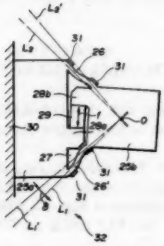
4,686,440

FINE POSITIONING DEVICE

Yotaro Hatamura, 12-11, Kohinata 2-chome, Bunkyo-ku, Tokyo, and Kozo Ono, Toride, both of Japan, assignors to Yotaro Hatamura and Hitachi Construction Machinery Co., Ltd., both of Tokyo, Japan

Filed Jan. 31, 1986, Ser. No. 824,958
Claims priority, application Japan, Mar. 11, 1985, 60-46443; Apr. 20, 1985, 60-83605
Int. Cl.[4] G05D *15/00*; G05B *11/01*
U.S. Cl. 318—646 **26 Claims**



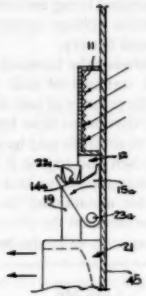


1. A fine positioning device characterized in that said device is equipped with at least one parallel flexible-beam displacement mechanism composed of a first rigid portion rigid against forces at least in one specific direction, a second rigid portion opposing to the first rigid portion and being rigid against forces at least in the same specific direction as above, plural flexible beams connecting the first rigid portion and the opposing second rigid portion to each other and arranged in parallel to each other or one another, and a first actuator mounted within the region surrounded by the first rigid portion, the second rigid portion and desired two of the plural flexible beams and adapted to have the plural flexible beam undergo bending deformation.

4,686,441
PHOTO ELECTRIC CHARGER DEVICE FOR LOW POWER ELECTRICAL DEVICE

Tor Petterson, 31248 Palos Verdes Dr. West, Palos Verdes, Calif. 90274

Filed Mar. 4, 1985, Ser. No. 708,434
Int. Cl.[4] H02J 7/00; H01M 10/46
U.S. Cl. 320—2 7 Claims



1. A photo electric charger device for providing a charging current to a chargeable battery having electrical terminals comprising:

support means comprising a panel;

photo-electric cell means comprising an array of photo-electric cells mounted on said panel;

first electrical contact means connected to receive the electrical output of said photo-electric cell means;

arm means for supporting said first contact means, said arm means being mounted on said support means;

means for supporting said chargeable battery;

second electrical contact means;

means for electrically coupling the second electrical contact means to the electrical terminals of the battery; and

support bracket means attached to the battery for providing a mount for said second electrical contact means;

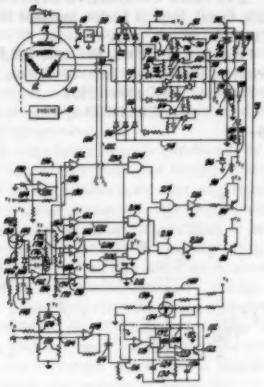
said support bracket means being removably supported on said arm means with said first contact means in abutment against said second contact means and in electrical contact therewith.

4,686,442
DUAL VOLTAGE ELECTRICAL SYSTEM

Thomas A. Radomski, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 28, 1986, Ser. No. 856,769
Int. Cl.[4] H02J 7/00
U.S. Cl. 320—17 7 Claims

1. A dual voltage motor vehicle electrical system comprising, an alternating current generator having a polyphase output winding, a polyphase full-wave bridge rectifier comprised of groups of positive and negative diodes, said bridge rectifier having AC input terminals connected to said output winding and having positive and negative direct voltage output terminals, first and second storage batteries connected in series and across said direct voltage output terminals of said bridge rectifier, the negative terminal of one battery and the positive terminal of the other battery being connected to a common junction, a first switchable rectifying circuit connected between said junction and said AC input terminals, said first switchable rectifying circuit when biased conductive and one of said groups of diodes supplying charging current to one of said batteries, a second switchable rectifying circuit connected between said junction and said AC input terminals, said second switchable rectifying circuit when biased conductive and the other group of said diodes supplying charging current to the other battery, means for causing said switchable rectifying circuits to be biased alternately conductive, means for sensing the relative magnitudes of the voltages across said batteries, and means responsive to the difference in the voltages across the batteries for controlling the time periods that said switchable rectifying circuits are biased conductive, said last-named

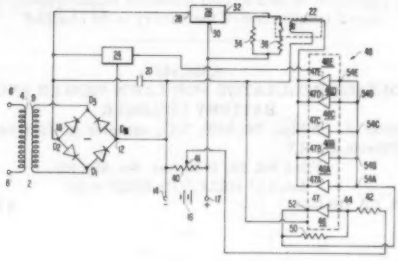


means operative to cause the switchable rectifying circuit that supplies current to the battery that has the lower voltage to be biased conductive for a time period that is longer than the time period of conduction of the other switchable rectifying circuit.

4,686,443
CONSTANT CURRENT, FAST AND FLOAT RATE, VARIABLE HYSTERESIS BATTERY CHARGER

Bernard J. Steblay, Lakewood, Colo., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jul. 25, 1986, Ser. No. 889,156
Int. Cl.[4] H02J 7/10
U.S. Cl. 320—23 8 Claims



1. A battery charging circuit connected to a voltage source and the terminals of a battery for maintaining a charge on the battery comprising:

input means connected to said voltage source;

current regulating means connected to said input means for providing a constant current output to said battery;

resistive means connected to said regulating means for selectively setting charging rate currents provided to said battery by said regulating means;

switching means connected to said resistive means for controlling the operation of said resistive means;

means for sensing the state of charge of said battery connected across the terminals of said battery; and

integrated buffer circuit means connected between sensing means and said switching means to control the operation

of said switching means in response to the state of battery charge sensed by said sensing means.

4,686,444

BATTERY CHARGING CIRCUIT

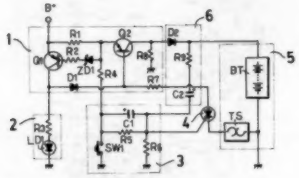
Beom C. Park, Seoul, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Nov. 15, 1985, Ser. No. 798,590

Claims priority, application Rep. of Korea, Nov. 21, 1984, 1984-11849; Nov. 21, 1984, 1984-11851

Int. Cl.[4] H02J *7/10*

U.S. Cl. 320—31 **2 Claims**



1. A circuit for charging a battery comprising:

a power supply means for connection to a B^+ power supply;

an input switching section coupled to said power supply means comprising:

a first transistor coupled to said power supply means;

a zener diode coupled to said first transistor for providing a means for regulation of voltage;

a second transistor having its emitter coupled to said zener diode;

wherein said input switching section supplies means to regulate said B^+ power in response to the presence of a voltage at the base of said second transistor;

a means for sensing the temperature of said charging battery;

a thyristor coupled to said second transistor in said input switching section and which is conductive in response to the presence of a base voltage of said second transistor and the sensed temperature of said battery for controlling the operation of said second transistor in accordance with a sensed temperature of the battery to be charged.

4,686,445

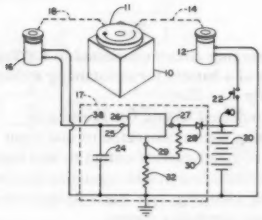
VOLTAGE REGULATOR FOR LAWN MOWER ENGINE BATTERY CHARGER

Charles E. Phillips, Ft. Mill, S.C., assignor to Textron Inc., Providence, R.I.

Filed Jul. 10, 1986, Ser. No. 884,203

Int. Cl.[4] H02J *7/10*; **H02P** *9/00*

U.S. Cl. 320—61 **1 Claim**



1. In combination with a lawn mower electrical system of the type wherein a lead-acid storage battery supplies an electrical engine cranking motor with a voltage for placing said engine in a running condition and, when said engine is running, electricity is generated by an alternator coupled to said engine for recharging said battery, the output of said alternator being a pulsating positive voltage having a peak value greater than the terminal value of the storage battery when said storage battery is fully charged, the improvement which comprises:

a ripple smoothing capacitor encircuited to shunt the output of said alternator,

a 3-terminal integrated circuit packaged positive voltage regulator having a voltage input terminal, a voltage output terminal and an output voltage adjustment terminal, the voltage input terminal being encircuited to be in continuity with the positive voltage output of said alternator and in series with said battery;

a diode encircuited between the terminal of said battery and the voltage output terminal of said 3-terminal positive voltage regulator, the polarity of said diode being oriented to permit charging current to flow into said battery, but precluding current drain from said battery to said voltage regulator module when said engine is stopped, and

reference voltage means applied to said output voltage adjustment terminal for maintaining the charging voltage across the battery terminals at the predetermined value for limiting the charging current to the battery.

4,686,446

POWER GENERATION CONTROL APPARATUS FOR ALTERNATING CURRENT GENERATOR

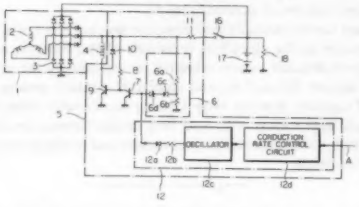
Shinji Nishimura; Hifumi Wada, and Keiichi Komurasaki, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 6, 1986, Ser. No. 836,827

Claims priority, application Japan, Mar. 14, 1985, 60-50951; Mar. 14, 1985, 60-50952

Int. Cl.[4] H02J *7/14*

U.S. Cl. 322—33 **2 Claims**



1. A control apparatus for a vehicle alternating current generator means supplying an output voltage to a battery and an electric load connected across said generator means output voltage and said battery, said generator means having a field winding, said control apparatus comprising, in combination:

voltage regulating means for controlling the output voltage of said generator means to a predetermined regulated value including a first switching means connected to detect the output voltage and operating to switch on and off at the predetermined regulated value;

control means for controlling field current in said field winding in response to the operating of said first switching means to maintain the output voltage at the regulated value;

second switching means connected to operate said control means independently of said first switching means so as to control the output voltage of said generator means independently of said first switching means upon the occurrence of an operating state;

said second switching means including a temperature sensor for detecting the operating state temperature of at least one of the portions of said generator means which are subject to a self-heat generation; and

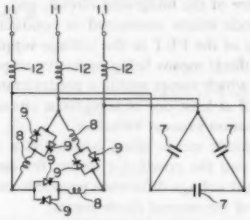
an oscillator for generating an output signal oscillating at a conduction rate corresponding to the temperature detected by said temperature sensor.

4,686,447

STATIC VAR COMPENSATORS

Masatoshi Takeda, Nishinomiya, and Nobuo Sashida, Kobe, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1985, Ser. No. 784,043
Claims priority, application Japan, Nov. 1, 1984, 59-228867
Int. Cl.[4] G05F *1/70*; H02J *3/18*
U.S. Cl. 323—210 **2 Claims**



1. In a power transmission system having a static var compensator (SVC) connected at a line node between a source and a fluctuating load for compensating for changes in reactive power resulting from load current fluctuations in response to a load fluctuation, and a current detector for monitoring load current fluctuations, said static var compensator including a capacitor and a first reactor connected in parallel at a common node and having large rated capacities for producing and absorbing reactive power, respectively, and a static switch means for controlling current flow through said first reactor so as to control the reactive power produced, the improvement in the SVC comprising:

a second reactor means separate from line reactance disposed between the line node and the common node for providing, in combination with said capacitor and said first reactor, a maximum leading reactive capacity so as to effectively reduce the capacities thereof,

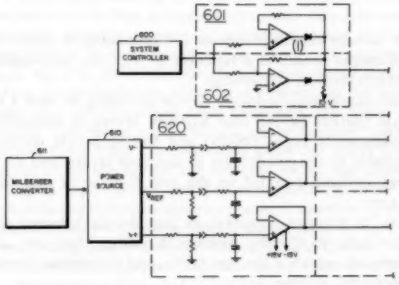
said second reactor means increasing the reactive power produced by said capacitor when the reactive power absorbed by said first reactor is low and decreasing the reactive power produced by said capacitor when the reactive power absorbed by said first reactor is high.

4,686,448

SLEWING POWER SUPPLY FOR PROGRAMMABLE PHASE SHIFTER DRIVE

Franklin B. Jones, Baltimore; Charles S. Kerfoot, Pasadena, and Walter E. Milberger, Severna Park, all of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 1, 1986, Ser. No. 891,822
Int. Cl.[4] G05F *1/70*
U.S. Cl. 323—212 **5 Claims**



1. A slewing power supply, for use with a system controller which outputs voltage command signals which dynamically directs said slewing power supply to produce a responsive slewed output voltage to drive an inductive load, said slewing power supply comprising:

a Milberger converter which produces a combined square wave output signal composed of a positive voltage signal component and a negative voltage signal component;

a power source which outputs a reference voltage signal which is a floating base voltage, said power source also receiving said combined square wave output signal from said Milberger converter and separately outputting said positive voltage signal component and said negative voltage signal component; and

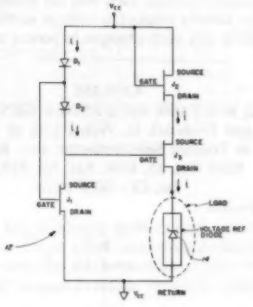
a means for regulating signals produced by said power source in accordance with said voltage command signals produced by said system controller, said regulating means being electrically connected with said power source and said system controller and outputting to said inductive load said responsive slewed output voltage in a form which comprises a first and second complementary voltage signal, said first complementary voltage signal being produced by respectively measuring said positive voltage signal component and said negative voltage signal component with said reference voltage signal to produce a measured positive voltage signal and a measured negative voltage signal, said regulating means then outputting said first and second complementary voltage signals by respectively comparing said measured positive voltage signal and said measured negative voltage signal with a rectified version of said voltage command signals, said regulating means producing said rectified version of said voltage command signals by rectifying said voltage command signals.

4,686,449

JFET CURRENT SOURCE WITH HIGH POWER SUPPLY REJECTION

Edward N. Jeffrey, and Chi-Cheong Shen, both of Richardson, Tex., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 7, 1986, Ser. No. 853,311
Int. Cl.[4] G05F *3/18*
U.S. Cl. 323—231 **10 Claims**



1. A constant current source comprising:

a voltage source;

a first field effect transistor having a gate, a drain and a source electrode, said gate and source electrodes being connected to said voltage source;

a second field effect transistor having a gate, a drain and a source electrode, said second field effect transistor being connected to said first field effect transistor;

means connected to said first field effect transistor for detecting a change in the voltage level of said voltage source for responding thereto to change the gatesource voltage

of said second field effect transistor whereby said drain electrode of said second field effect transistor has a constant current output, said means for detecting comprising:

a third field effect transistor having a gate, a drain and a source electrode; and

means connected to said third field effect transistor for providing a constant voltage at said gate of said second field effect transistor.

4,686,450

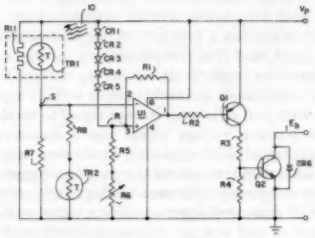
FLUID FLOW SENSOR

Alfred Pichat, Livingston, N.J., assignor to General Signal Corporation, Stamford, Conn.

Filed Apr. 4, 1986, Ser. No. 848,074

Int. Cl.[4] G05F *1/46*; G01F *1/68*

U.S. Cl. 323—282 **2 Claims**



1. A fluid flow sensor having a first sensing network including a thermistor and temperature compensation means connected in common to a sensor point, a second network including threshold adjustment means for adjusting the threshold at a threshold point, the two networks being connected across a power supply and means coupled to the two points and operative to generate an output signal that changes in value in response to the conditions in which the voltage at the sensor point (a) rises above and (b) falls below the voltage at the threshold point; the improvement comprising:

a voltage compensation circuit connected in the second network between the power supply and the threshold point and including a plurality of diodes arrange to approximate the response of the thermistor to changes in power supply voltage such that the voltage at the threshold point closely tracks the voltage at the sensor point in response to any such changes in power supply voltage.

4,686,451

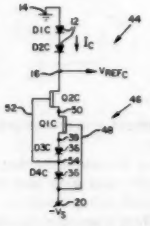
GAAS VOLTAGE REFERENCE GENERATOR

Jim Y. Li, and Frederick G. Weiss, both of Portland, Oreg., assignors to Triquint Semiconductor, Inc., Beaverton, Oreg.

Filed Oct. 15, 1986, Ser. No. 919,284

Int. Cl.[4] G05F *3/20*

U.S. Cl. 323—313 **15 Claims**



1. In a GaAs integrated circuit, a GaAs voltage reference generator comprising:

a first diode means connected to conduct current from a nominal ground node to a voltage reference node;

a depletion-mode FET connected in series with the first diode means, the FET having a gate, a drain coupled to the reference node and a source coupled to a voltage supply node;

conductor means coupling the gate of the FET to the voltage supply node for current-source connecting the FET to cause a current to flow between the ground node and the voltage supply node, the current being substantially constant for a constant voltage difference between the gate and source of the FET and a constant operating temperature of the integrated circuit; and

a second diode means connected to conduct current from the source of the FET to the voltage supply node;

each of the diode means being operative to produce a voltage drop which varies within a predetermined range as a function of at least one of integrated circuit temperature and fabrication process variations;

the second diode means being coupled in a loop including the FET and the conductor means for determining and varying said voltage difference proportionally to the voltage drop of the second diode means;

the current-source connected FET being responsive to a variation in said voltage difference to vary said current so as to compensate for a variation in voltage drop across the diode means due to temperature or process variations and thereby provide a predetermined voltage at the voltage reference node that remains constant for a constant supply voltage.

4,686,452

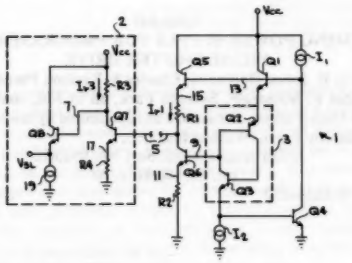
REFERENCE-VOLTAGE SOURCE FOR REPLICATING A TERMINAL VOLTAGE OF A SATURATED TRANSISTOR

Thomas S. Wong, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Apr. 3, 1986, Ser. No. 847,412

Int. Cl.[4] G05F *3/20*

U.S. Cl. 323—314 **18 Claims**



1. A voltage-reference circuit for producing a reference-voltage output which is a function of V_{be}, the base-emitter drop of a transistor, comprising:

a multi-layer semiconductor device including at least a region thereof having four adjacent layers of alternating conductivity type (PNPN) and having a first terminal coupled to the end P-layer of said four layers, and a second terminal coupled to the end N-layer of said four layers;

means to produce a current in said device between said terminals, to thereby produce a voltage between said terminals which is the sum of V_{be} and an intrinsic transistor terminal drop;

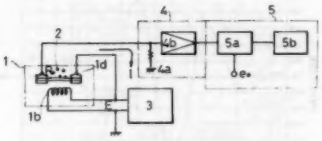
means coupled to said terminals to subtract from said voltage said intrinsic transistor terminal drop.

4,686,453

OIL MIST DETECTION METHOD AND APPARATUS

Takayuki Kato, Aichi, and Makoto Miyamoto, Kariya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Nov. 5, 1985, Ser. No. 795,180
Claims priority, application Japan, Nov. 5, 1984, 59-233850
The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.
Int. Cl.[4] G01R 27/02
U.S. Cl. 324—65 R 4 Claims



1. An oil mist detection method which comprises the steps of:

permitting an oil mist in an inert gas to adhere onto a surface of an insulating body,

forming the adhered oil mist into a conductive carbon deposit by heat decomposition,

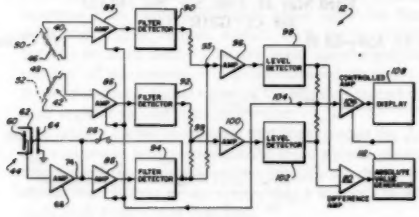
detecting an accumulated amount of the deposit as a variation of an electric resistance through said deposit, and detecting a concentration of said oil mist in said gas from a value of said electric resistance.

4,686,454

CONDUCTOR TRACER WITH IMPROVED OPEN CIRCUIT DETECTION, CLOSE-RANGE DISCRIMINATION AND DIRECTIONALITY

Joseph P. Pecukonis, Littleton, Colo., assignor to Pasar, Inc., Denver, Colo.

Filed Aug. 22, 1984, Ser. No. 643,673
Int. Cl.[4] G01R 19/00; G01V 3/08, 3/10
U.S. Cl. 324—67 20 Claims



1. In an apparatus for tracing and identifying an electrical conductor or the like, comprising generator means in combination with detector means, the generator means operatively generating a predetermined tracer signal and applying the tracer signal to the conductor, the predetermined tracer signal having a high frequency component wherein the voltage fluctuates at a predetermined high frequency, the tracer signal creating corresponding fluctuating electromagnetic and electrostatic fields from the conductor when the tracer signal is applied to the conductor, the detector means operatively detecting at least one of the electromagnetic or electrostatic fields when the detector means is placed in operative proximity with the conductor, and an improvement comprising:

electromagnetic transducer means of said detector means, the electromagnetic transducer being responsive to electromagnetic fields and being operative for supplying an output signal related to the electromagnetic field from the conductor created by the tracer signal when said detector means is placed in operative proximity to the conductor carrying the tracer signal;

electrostatic transducer means of said detector means, the electrostatic transducer being responsive to electrostatic fields and being operative for supplying an output signal related to the electrostatic field from the conductor created by the tracer signal when said detector means is placed in operative proximity to the conductor carrying the tracer signal;

first filter detector means responsive to the output signal from the electromagnetic transducer means and operative for detecting signals substantially only at the predetermined high frequency and for supplying a first detector output signal related to the magnitude of the signal at the predetermined high frequency detected by the electromagnetic transducer means;

second filter detector means responsive to the output signal from the electrostatic transducer means and operative for detecting signals substantially only at the predetermined high frequency and for supplying a second detector output signal related to the magnitude of the signal at the predetermined high frequency detected by the electrostatic transducer means;

combining means receptive of the detector output signals and operative for combining the first and second detector output signals to thereby obtain a composite signal; and

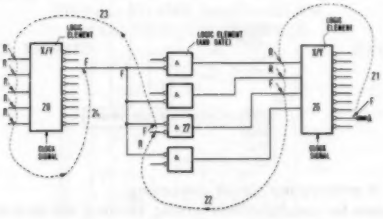
means for including a display responsive to the composite signal and operative for supplying a display indication related to the composite signal.

4,686,455

METHOD FOR THE LOCALIZATION OF TIME-CRITICAL EVENTS WITHIN A CLOCK ELECTRONIC CIRCUIT

Reiner Lassmann; Albert Krupp, and Peter Fazekas, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Aug. 2, 1984, Ser. No. 636,925
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1983, 3335671
Int. Cl.[4] G01R 15/12, 31/00, 31/28
U.S. Cl. 324—73 R 9 Claims



1. A method for localizing time-critical events within a clocked electronic circuit which comprises a plurality of interconnected logic elements and which has a limit frequency at which the circuit cannot function properly, comprising the steps of:

applying increasing clock frequencies to the electronic circuit and measuring the outputs of the circuit to identify the limit frequency of the circuit;

applying a sequence of test patterns to the circuit at a clock frequency which is greater than the identified limit frequency and with the test pattern sequence composed of individual test patterns which are applied in a defined succession and measuring the outputs of the circuit for an error perceived at a number n of an individual test pattern at which the error is perceived, where n is defined by the position of the individual error-causing test pattern in the test pattern sequence;

applying to the circuit the individual test patterns preceding the test pattern n in the test pattern sequence and the test pattern n in the sequence corresponding to the original test pattern sequence by applying the first n−m test patterns to the circuit with a clock frequency which is greater than the limit frequency and by applying the m test patterns following the test pattern n−m with a clock frequency which is lower than the limit frequency, where m=1 and is respectively increased by one unit after each run of the n test patterns and measuring the output after each run of the n test patterns to determine whether the error is still present at the output of the circuit; and

repeating the steps of applying the test patterns preceding the test pattern n in the test pattern sequence and the test pattern n with the first n−m test patterns applied at the clock frequency greater than the limit frequency and the m test patterns following the test pattern n−m until an error no longer appears at the output of the circuit and, therefore, an identification is made that the test pattern n−M generates the error within the circuit, where M is the number of runs of the n test patterns; and

performing error tracking to localize the cause of the error.

4,686,456

MEMORY TEST CIRCUIT

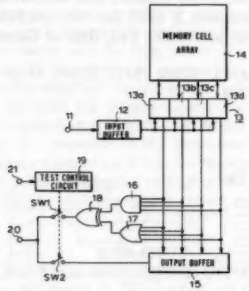
Tohru Furuyama, Tokyo, and Takashi Ohsawa, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 31, 1986, Ser. No. 846,143

Claims priority, application Japan, Jun. 18, 1985, 60-132597; Jun. 18, 1985, 60-132596

Int. Cl.[4] G01R *31/26;* G11C *29/00*

U.S. Cl. 324—73 R **3 Claims**



1. A memory test circuit comprising:

means for simultaneously writing identical test data to several memory cells;

means for simultaneously reading said test data written to said memory cells;

means for obtaining a first logical product operation of said test data read from said memory cells;

means for obtaining a second logical sum operation of said test data read from said memory cells; and

means for inspecting whether or not said memory cells having written test data operate correctly on the basis of said first logical product operation and second logical sum operation of said test data read from said memory cells;

wherein said memory test circuit further comprises means for obtaining an exclusive logical sum of said logical product and logical sum of said test data and wherein an inspection of whether or not said memory cells having written test data operate correctly is carried out on the basis of said exclusive logical sum.

4,686,457

METHOD FOR MEASURING A SIGNAL'S FREQUENCY COMPONENTS

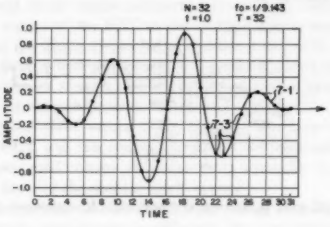
Takuo Banno, Hachioji, Japan, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 1, 1986, Ser. No. 891,824

Claims priority, application Japan, Aug. 8, 1985, 60-174837

Int. Cl.[4] G01R *23/16*

U.S. Cl. 324—77 R **5 Claims**



1. A method comprising the steps of:

sampling and digitizing an input signal;

multiplying said sampled and digitized input signal by a window having a known fourier transform;

obtaining the digital fourier transform of said input signal multiplied by said window;

selecting two spectral components;

fitting the fourier transform of said window to said selected spectral components; and

determining the frequency components of said input signal from said fitting.

4,686,458

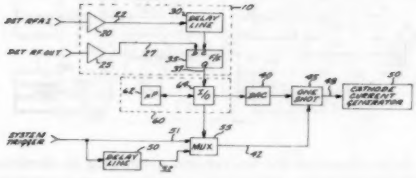
PULSE ALIGNMENT SYSTEM

Daniel M. Beyerbach, Anaheim; William L. Scott, Whittier, both of Calif., and Robert W. Goczalk, Acton, Mass., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 31, 1985, Ser. No. 740,113

Int. Cl.[4] G01R *25/00*

U.S. Cl. 324—83 D **18 Claims**



1. An automated method for aligning first and second pulse signals in relation to each other where the second pulse signal is generated at a substantially fixed time delay after a reference trigger signal, comprising the steps of:

providing a variable time delay means for varying the time delay between said trigger signal and said first pulse signal;

providing a means for generating a coincidence signal indicating when said first pulse signal is in coincidence with said second pulse signal, and

in an iterative process, stepping said time delay means through a plurality of time delays while monitoring said coincidence signal to find the time delay parameter resulting in the coincidence of said first pulse signal and said second pulse signal.

4,686,459

LEVEL INDICATOR

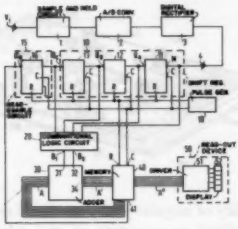
Henk W. A. Begas, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 16, 1985, Ser. No. 776,729

Claims priority, application Netherlands, Sep. 25, 1984, 8402918

Int. Cl.[4] G01R *15/10*

U.S. Cl. 324—132 **7 Claims**



1. A level indicator for displaying in decibels values of successive digital samples of an analog signal with respect to a reference value, such samples being binary coded digital signals having a predetermined number of bits representing logic values relative to such reference value, which level indicator comprises a read-out device and a digital signal converting circuit having an input to which such digital signals are serially applied and which, in response to each such digital input signal, causes the read-out device to display the decibel value thereof; characterized in that such digital signal converting circuit comprises:

a first shift register having an input at which the successive digital input signals are serially received, the most significant bit of each such signal being first, and having a storage capacity less than said predetermined number of bits, such shift register further having a plurality of outputs at which it produces digital output signals respectively corresponding to the binary values of the digital input signal bits stored therein;

a combinational logic circuit coupled to said shift register to combine each successive digital input signal bit thereto with the digital output signals then being produced thereby so as to derive a binary logic signal signifying a number of increments of a predetermined decibel value for attenuating a digital value of the bits then stored in the shift register to said reference value;

digital adding means coupled to said logic circuit for deriving successive binary sums of the logic signals produced thereby in response to successive bits of each digital input signal, such adding means comprising a memory in which each such binary sum is stored;

and a read-enable circuit coupled to said memory for transferring the binary sum stored in said memory to said read-out device each time the number of bits of a digital input signal stored in said shift register, and which immediately succeed a bit of such signal having the same logic value as said reference value, reaches the capacity of said shift register.

4,686,460

SOLID STATE ELECTRICITY METER DISPLAY

Ray Stevens, Roswell, and Duane Perry, Lawrenceville, both of Ga., assignors to Sangamo Weston, Inc., Norcross, Ga.

Filed Apr. 11, 1986, Ser. No. 850,573

Int. Cl.[4] G01R *21/06, 13/00*

U.S. Cl. 324—142 **8 Claims**

1. A solid state electricity meter, comprising:

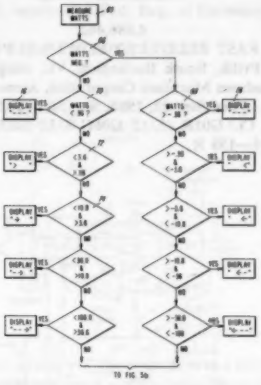
measurement means coupled to a power line for obtaining voltage and current measurements;

multiplier means for multiplying together said measurements to obtain the magnitude and direction of line power;

a display comprising a single linear series of segments;

first memory means storing a plurality of reference line powers having predetermined magnitudes;

second memory means storing a plurality of different non-alphanumeric indicia;



comparator means for comparing a line power obtained from said multiplier means with said plurality of references stored in said first memory means; and

control means responsive to said comparator means for applying to said display selected ones of said non-alphanumeric indicia to form a vector representation of the magnitude and direction of measured line power.

4,686,461

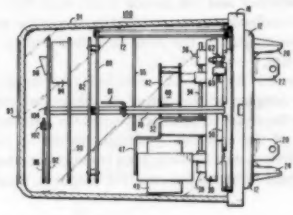
AUXILIARY EQUIPMENT MOUNTING RING FOR ELECTRIC METER

Steven B. Davis, St. Mathews Twp., Knightdale Co., N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jul. 12, 1984, Ser. No. 630,034

Int. Cl.[4] G01R *1/04;* **H02B** *9/00*

U.S. Cl. 324—157 **9 Claims**



1. An electrical apparatus, comprising:

a base;

a support structure comprising a base ring, a plurality of posts and support plate, said base ring having a central axis of symmetry and being removably attachable to said base ring, each of said plurality of posts having one end connected to said base ring, said support plate being attached to at least one of said plurality of posts, and being generally perpendicular to said plurality of posts, said posts being disposed on the base ring in a radial pattern about the central axis of symmetry of the base ring in such a way

as to permit the support structure to pass over and beyond existing components mounted on the base; and

means for removably attaching said base ring to said base, said attaching means comprising a plurality of latches, each of said plurality of latches having an axis of rotation and being shaped to be received in rotatable association with said base ring to removably attach said base ring to said base.

4,686,462

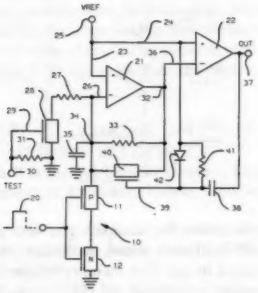
FAST RECOVERY POWER SUPPLY

Ronald J. Prilik, South Burlington, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 26, 1985, Ser. No. 780,533

Int. Cl.[4] G01R *15/12;* **G06G** *7/12;* **H03K** *5/153*

U.S. Cl. 324—158 R **5 Claims**



1. A logic tester, a fast recovery power supply for supplying high current to a device under test and for measuring a low current of said device under test comprising:

first and second amplifiers, each of said amplifiers having first and second inputs and each of said amplifiers having an output,

the first amplifier coupled between a reference voltage and a device under test,

the reference voltage being coupled to a first input of the first amplifier,

the second amplifier being coupled between the reference voltage and the output of the first amplifier,

capacitive means being coupled to the second input of the first amplifier and the device under test,

resistive feedback means coupled between the second input and the output of the first amplifier and to the device under test,

characterized by an AC coupled impedance switching means coupled to the output of the second amplifier and across the resistive feedback means for reducing the impedance of the resistive feedback means to recharge the capacitive means by switching on said impedance switching means to shunt the resistive feedback means.

4,686,463

MICROWAVE PROBE FIXTURE

John K. Logan, 26527 Silver Spur Rd., Rancho Palos Verdes, Calif. 90274

Filed Dec. 24, 1984, Ser. No. 685,410

Int. Cl.[4] G01R *1/06, 31/02*

U.S. Cl. 324—158 P **13 Claims**

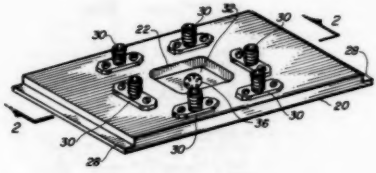
1. A multiport microwave semiconductor wafer node point and inspection point probe fixture comprising:

(a) a header plate having a top, bottom, and an aperture centrally located therethrough:

(b) a plurality of threaded microwave connectors attached at right angles to said header plate in spaced relationship with said aperture having the connector contact penetrating through said header plate for external attachment;

(c) a substrate disposed beneath said header plate aperture having an access opening centrally located therein;

(d) a plurality of conductive striplines fixed to the underside of said substrate extending from said access opening to the outside edge in alignment and contiguous with said microwave connector contacts and,



(e) a plurality of angular probe needles fixed to said conductive striplines in proximity of said substrate aperture in such a position as to align with node points and test points on said semiconductor wafer extending the electrical conductivity flowpath from said needle through the stripline to said microwave connector providing means to test the wafer circuits.

4,686,464

BUCKLING BEAM TEST PROBE ASSEMBLY

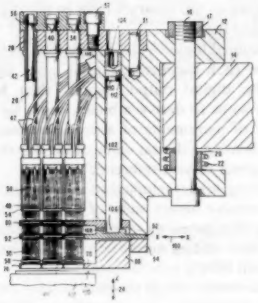
Michael Elsässer, Herrenberg, and Roland Stöhr, Nufrigen, both of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 3, 1985, Ser. No. 740,772

Claims priority, application European Pat. Off., Jun. 22, 1984, 84107154.1

Int. Cl.[4] G01R *1/06, 31/02*

U.S. Cl. 324—158 P **14 Claims**



1. A buckling beam test probe assembly comprising a plurality of electrically conductive probe wire arrays wherein each wire is free to buckle in the X-Y direction when a force is applied in the Z direction by contacting a product being tested, and wherein said assembly includes mounting members means suitable to fix said plurality of probe wire arrays in a grid-like structure, said mounting members means comprising;

a plurality of guide means for determining the array position of each buckling beam in said array with each buckling beam slidably arranged in holes of each said guide means, each of said guide means being coupled together by slender stabilizing means fixedly arranged at the periphery of each said guide means for maintaining the position of each said guide means along the Z direction; and

at least one frame means having a plurality of openings in which respective ones of said buckling beams are inserted,

said openings being arranged in 2 dimensions adjacent to each other so as to allow a densely arranged plurality of arrays of buckling beams, whereby each of said arrays may occupy the full area of the assigned guide means except the positions of the stabilizing means, said frame means being movable in the Z direction by a given amount so as to restrain motion of said buckling beams in the X-Y direction which arises when said beams contact in parallel the product being tested.

4,686,465

PROBE ASSEMBLY FOR CIRCUIT-BOARD TESTER

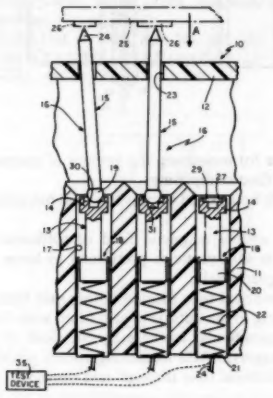
Gustav Krüger, Herrenberg, Fed. Rep. of Germany, assignor to Feinmetall GmbH, Herrenberg, Fed. Rep. of Germany

Filed Jun. 11, 1985, Ser. No. 743,671

Claims priority, application Fed. Rep. of Germany, Jun. 12, 1984, 3421799

Int. Cl.⁴ G01R *1/067, 1/073*

U.S. Cl. 324—158 P **20 Claims**



1. A probe assembly for testing at least partially conductive elements, the assembly comprising:

a dielectric base plate;

a plurality of conductive supports on the base plate generally insulated from each other thereby, and each having a forwardly open socket having a forwardly concave socket surface; and

a plurality of conductive contact rods, each having a substantially part-spherical rear ball end having an outer surface, and resting in a respective one of the sockets, and a forwardly directed front test end including a tip, one of the surfaces being formed with at least one edge engaging only in line contact with the other surface, whereby, when the tips are engaged with conductive regions of an element to be tested, electrical connection is made at the region of line contact between the contact rod and a corresponding support.

4,686,466

METHOD FOR AUTOMATICALLY SETTING THE VOLTAGE RESOLUTION IN PARTICLE BEAM MEASURING DEVICES AND APPARATUS FOR IMPLEMENTATION THEREOF

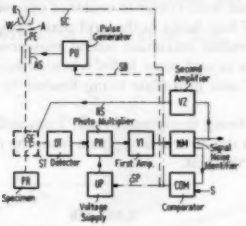
Hans-Peter Feuerbaum, and Peter Fazekas, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 27, 1985, Ser. No. 705,983

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1984, 3407071

Int. Cl.⁴ G01R *31/00*

U.S. Cl. 324—158 R **6 Claims**



1. A method for setting voltage resolution in a particle beam measuring apparatus utilizing a particle beam probe and which produces a measured signal, and wherein band width of measured signal processing is modified, comprising steps of:

creating a measured signal in a measured signal processing step;

measuring signal noise in the measured signal;

comparing said signal noise to a desired value for measured signal resolution; and

modifying a band width of the measured signal processing such that the signal noise of the measured signal is less than or equal to said desired value for the measured signal resolution.

4,686,467

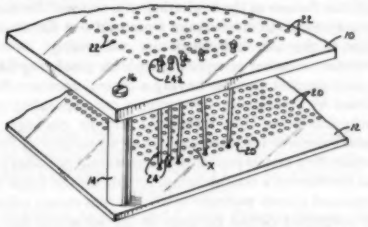
CIRCUIT BOARD TESTING SYSTEM

Dennis W. DeLapp, Jackson County, Mo., and Richard K. Roebuck, Johnson County, Kans., assignors to DIT-MCO International Corp., Kansas City, Mo.

Filed Mar. 21, 1984, Ser. No. 591,914

Int. Cl.⁴ G01R *31/02*

U.S. Cl. 324—158 F **3 Claims**



1. A system for testing printed circuit boards, said system comprising:

a pair of parallel horizontal plates secured in fixed relationship with one another, one said plate being a product pattern plate and the other a grid plate,

said grid plate being located below said product pattern plate and provided with a grid matrix of holes therethrough with the holes uniformly spaced in columns and transverse rows,

said pattern plate being provided with a plurality of holes conforming with the electrical contact points on the board to be tested, the centerlines of at least some of the holes in

the product pattern plate being laterally offset with respect to the centerline of the hole in the grid plate nearest to the centerline of each of said some holes,

a plurality of electrically conductive substantially rigid straight pins insertable through said holes in said pattern plate, said pins each having a head at one end above said pattern plate and a tip at the other end for passage through a hole in said grid plate, the outside dimension of said pins and the inside dimension of said holes in said product pattern plate being so related as to permit inclination of the pins in said some holes relative to the center line of said holes in which they are received sufficient to displace the tips of said pins in said some holes laterally into registry with the said nearest holes thereto in the grid plate,

the distance from center to center of opposed corner holes in a set of four holes in the grid plate being defined as Y,

the permissible maximum lateral movement of said tips of the pins in said some holes when adjacent the upper surface of said grid plate being limited to substantially one half Y,

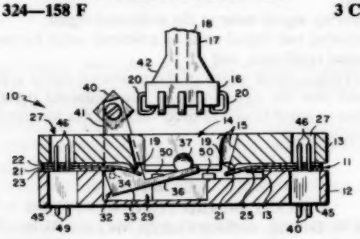
said pins being freely removable from said holes by movement in the direction opposite from the direction of insertion of the pins.

4,686,468

CONTACT SET FOR TEST APPARATUS FOR TESTING INTEGRATED CIRCUIT PACKAGE

Kenneth R. Lee, Lincoln, and Ernest L. Kallander, Jr., Southboro, both of Mass., assignors to Aseco Corporation, Marlboro, Mass.

Filed Dec. 10, 1984, Ser. No. 679,911
Int. Cl.[4] G01R *31/26;* H05K *7/02*
U.S. Cl. 324—158 F **3 Claims**



1. A test fixture for facilitating the connection of leads of an integrated circuit package to test apparatus, the test apparatus including ram means for supporting the integrated circuit package and for advancing it into a test position in registration with said test fixture at the beginning of a test and for retracting the integrated circuit package from said test fixture at the conclusion of the test, said test fixture comprising:

A. a contact member comprising a planar insulating flexible contact support member having a central aperture therein defined by a periphery substantially corresponding to the configuration of the integrated circuit package, said contact support member supporting a plurality of flexible contact strip means projecting beyond said periphery over said aperture in a configuration to contact the leads of the integrated circuit package when the ram means advances the integrated circuit package to the advanced test position; and

B. support means for supporting said contact member at the advanced test position, said support means including a lower support member and an upper guide member, said lower support member and guide member clamping said contact member therebetween,

C. said lower support member having:

i. an upper surface for supporting said contact member with said central aperture in registration with the advanced test position, and

ii. a test registration recess under said central aperture to allow said contact strips to flex downwardly when said ram means advances the integrated circuit package to said test position;

D. said upper guide member including:

i. a guide aperture defined by tapered sidewalls which force the integrated circuit package horizontally into registration with said contact strips as the ram means moves the package vertically to the advanced test position, and

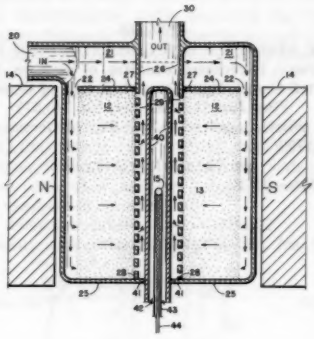
ii. lip means around the periphery of said guide aperture depending therefrom to depress said contact support member and said contact strips downwardly into said recess.

4,686,469

METHOD AND DEVICE FOR MEASURING MAGNETIC PARTICLES IN A FLUID

Robert T. Lewis, Albany, Calif., assignor to Tribometrics, Inc., Berkeley, Calif.

Filed Aug. 12, 1985, Ser. No. 764,552
Int. Cl.[4] G01N *27/74;* G01R *33/12*
U.S. Cl. 324—204 **4 Claims**



1. A device for measuring the amount of magnetic particles in a flowing fluid comprising:

a filter with holes sized to pass the fluid but entrap the particles;

a magnet with a magnetic field of sufficient strength to magnetize said particles positioned to have said filter in said magnetic field;

a long cylindrical tube located within said filter and having an opening to the outside of said filter, with the axis of said tube perpendicular to the magnetic field of said magnet; and a magnetic field measuring means positioned within said cylindrical tube through said opening.

4,686,470

MAGNETIC DISK FOR MEASURING THE AZIMUTH OF A TRANSDUCER HEAD

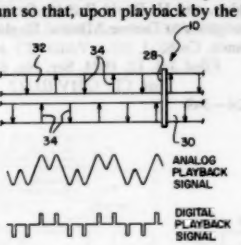
Charles R. Bond, Milpitas, Calif., assignor to Verbatim Corporation, Sunnyvale, Calif.

Filed Mar. 12, 1986, Ser. No. 838,864
Int. Cl.[4] G11B *20/20, 21/10;* G01B *7/30*
U.S. Cl. 324—207 **5 Claims**

1. A magnetic disk for measuring the azimuth of a magnetic head of a disk drive mechanism, said magnetic disk comprising:

a pair of concentric test tracks of relatively narrow trackwise width located adjacent each other so that each is straddled at the same time by the head gap of the magnetic head to be measured, each of said test tracks including a recording pattern comprising a predetermined series of magnetic domains of alternating orientation arranged to provide, in the trackwise direction between each domain of one orientation and the adjacent domain of the opposite

orientation, a relatively narrow transition zone, comparable to the length of the head gap but small relative to the length of a magnetic domain, the recording pattern on one test track being recorded out of phase with respect to the recording pattern on the other test track by a fixed predetermined amount so that, upon playback by the head to be



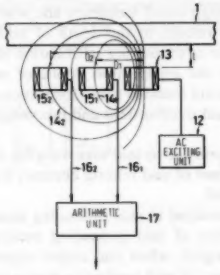
measured, a composite output signal is produced comprising a time-ordered series of localized peaks corresponding to the resultant series of transition zones on both test tracks, with the timing between adjacent peaks being functionally related to the azimuth of the head being measured.

4,686,471

SYSTEM FOR ONLINE-DETECTION OF THE TRANSFORMATION VALUE AND/OR FLATNESS OF STEEL OR A MAGNETIC MATERIAL BY DETECTING CHANGES IN INDUCED VOLTAGES DUE TO INTERLINKED MAGNETIC FLUXES IN DETECTING COILS

Masahiko Morita; Osamu Hashimoto, both of Kurashiki, and Tomoo Tanaka, Chiba, all of Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Oct. 9, 1984, Ser. No. 658,606
Int. Cl.[4] G01N *27/72;* G01R *33/12*
U.S. Cl. 324—243 **9 Claims**



1. A system for online-detection of a transformation value and/or a flatness of a steel comprising:

an exciting coil located at a spaced distance from one side of the surface of the steel and capable of generating alternating magnetic fluxes by alternating current excitations;

at least two detecting coils arranged on the same side and at substantially the same spaced distance from said steel as said exciting coil, said detecting coils being arranged at positions different in distance from said exciting coil in a direction parallel to the surface of said steel, and having induced voltages due to the magnetic fluxes generated by said exciting coil; and

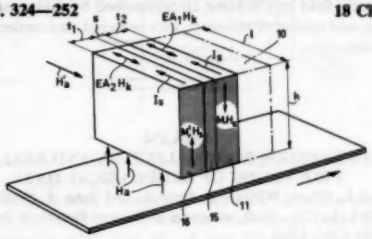
an arithmetic unit for calculating and outputting the transformation value and the flatness of said steel or either one of those, said arithmetic unit being independently electrically coupled with each of said detecting coils such that values of the induced voltages in the detecting coils are input into said arithmetic unit and at least one of the transformation value and the flatness of said steel is calculated by the arithmetic unit in accordance with a predetermined formula using the values of the induced voltages.

4,686,472

MAGNETIC SENSOR HAVING CLOSELY SPACED AND ELECTRICALLY PARALLEL MAGNETORESISTIVE LAYERS OF DIFFERENT WIDTHS

Johannes A. C. Van Ooijen, Asperen, and Jacobus J. M. Ruigrok, Eindhoven, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 681,716, Dec. 13, 1984, abandoned, which is a continuation of Ser. No. 369,957, Apr. 19, 1982, abandoned. This application Feb. 10, 1986, Ser. No. 828,582
Claims priority, application Netherlands, Apr. 22, 1981, 8101962
Int. Cl.[4] G01R *33/02;* H01L *43/08;* G11C *19/08*
U.S. Cl. 324—252 **18 Claims**



1. In a magnetic sensor assembly for detecting signals recorded on an associated magnetic medium, the sensor comprising:

two magnetostatically coupled magnetoresistive elements, each element having a respective planar surface, the respective planar surfaces being mutually parallel and being mutually separated by a distance, each element also having an easy axis of magnetization oriented substantially parallel with the respective planar surface;

the recorded signals provided a magnetic signal field applied to the magnetoresistive elements in a signal direction; and

means for providing, in operation of the sensor, measuring currents which simultaneously flow in a current direction through the elements so that each measuring current flowing through an element serves to provide the sole magnetic bias for the other of the elements, the magnetizations of the elements being biased in opposite directions;

wherein, in operation of the sensor, the magnetizations of the elements are oriented perpendicularly to the current direction and parallel with the signal direction, each of the magnetoresistive elements having a respective thickness measured in a direction perpendicular to the respective planar surface, the thicknesses of the magnetoresistive elements being different.

4,686,473

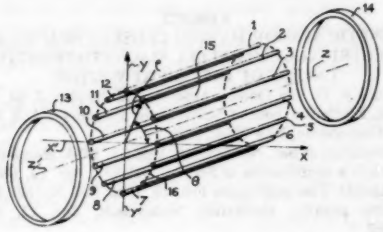
DEVICE FOR CREATING AND/OR RECEIVING AN ALTERNATING MAGNETIC FIELD FOR AN APPARATUS USING NUCLEAR MAGNETIC RESONANCE

René Chesneau, Sceaux, and Claude Prevot, Antony, both of France, assignors to Thomson-CGR, Paris, France

Filed Jul. 8, 1985, Ser. No. 752,874
Claims priority, application France, Jul. 10, 1984, 84 10939
Int. Cl.[4] G01R *33/20*
U.S. Cl. 324—320 **16 Claims**

1. A device for generating and/or receiving an alternating magnetic field for an apparatus using nuclear magnetic resonance comprising parallel elongated conducting wires disposed on a non-circular cylinder, means for causing a current to flow through each conducting wire of intensity corresponding to a trigonometric function, $\rho \cos \theta$, of polar coordinates ρ,θ of each of said conducting wires with respect to an origin

of a system of reference axes orthogonal to the conducting wires in order to generate a homogeneous radio frequency



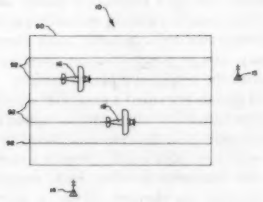
magnetic field in a volume circumscribed by said conducting wires, said system of reference axes centered on a center of said volume.

4,686,474

SURVEY SYSTEM FOR COLLECTION AND REAL TIME PROCESSING OF GEOPHYSICAL DATA

Steven L. Olsen; William R. Petrick, and John A. Stodt, all of Salt Lake City, Utah, assignors to Deseret Research, Inc., Salt Lake City, Utah

Filed Apr. 5, 1984, Ser. No. 597,251
Int. Cl.[4] G01V *3/08, 3/16;* H04N *7/18*
U.S. Cl. 324—331 **15 Claims**



1. A real time aerial survey system for conducting aerial surveys over a survey area, the system comprising:

an aircraft;

means, carried by said aircraft, for detecting one or more parameters which define geophysical data;

a base means for automatically tracking and computing the position of the aircraft according to horizontal and vertical flight positioning data determined relative to said survey area;

means, responsive to said tracking means and carried on said aircraft, for automatically guiding said aircraft along preselected flight lines over said survey area according to said automatically computed horizontal and vertical flight positioning data;

means, carried by said aircraft and connected to said detecting means, for transmitting radio signals representing said parameters defining said geophysical data and representing said horizontal and vertical positioning data;

means located adjacent said survey area, for receiving said radio signals representing said parameters and representing said horizontal and vertical positioning data; and

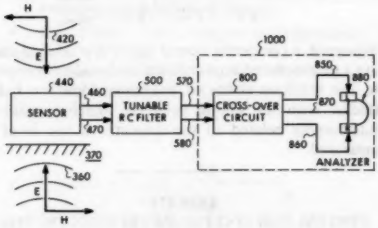
means, responsive to both said tracking means and to said radio signal receiving means, for correlating in realtime the geophysical data with the position of the aircraft in relation to said survey area at each instant of time when said parameters were detected.

4,686,475

PASSIVE GEOPHYSICAL PROSPECTION SYSTEM BASED UPON THE DETECTION OF THE VERTICAL ELECTRIC FIELD COMPONENT OF TELLURIC CURRENTS AND METHOD THEREFOR

Carl L. Kober, and H. David Procter-Gregg, both of Littleton, Colo., assignors to Denver Mineral Exploration Corp., Highlands Ranch, Colo.

Filed Jul. 12, 1984, Ser. No. 630,432
Int. Cl.[4] G01V *03/12*
U.S. Cl. 324—349 **29 Claims**



1. A passive geophysical prospection system for determining the identity and depth of strata under the earth's surface by detection of the time-varying vertical electric field component of telluric currents from said strata, said strata having overburdens and inhomogeneities contained therein, said time-varying electric field component of said telluric currents having an audio bandwidth in a low frequency window from zero frequency to a high cutoff frequency and wherein said high cutoff frequency is related to the depth of said strata, said system being capable of outputting information to an operator corresponding to the prospection depth of said system and the identity of strata found at said prospection depth including the identity of said overburdens and inhomogeneities, said system comprising:

means responsive to said time-varying vertical electric field component of said telluric currents for producing an output signal,

means connected to said producing means for adjusting the impedance of said producing means to maximize said output signal, when said output signal is maximized said impedance of said producing means substantially matches the impedance of said earth's surface and said output signal varies in time with said time-varying vertical electric field component,

means connected to said adjusting means and receptive of said maximized output signal from said adjusting means for tuning said maximized output signal in said audio bandwidth by decreasing the high cutoff frequency end of said audio bandwidth, the value of said high frequency cutoff end of said audio bandwidth being indicative of said prospection depth in said strata, said tuning means being capable of extending all frequencies of said maximized output signal through said audio bandwidth as a tuned signal, said tuning means having soft roll-off characteristics of minus 3 dB to minus 6 dB per octave, and

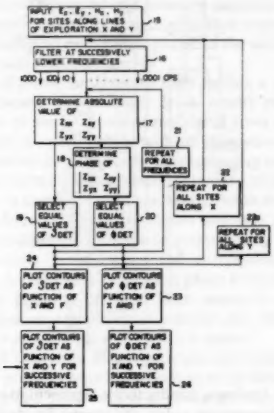
means connected to said tuning means and receptive of said tuned signal from said tuning means for generating an output containing said information corresponding to said identity of said strata including said identity of said overburdens and inhomogeneities at said prospection depth.

4,686,476

PLOTTING OF MAGNETOTELLURIC IMPEDANCE TO DETERMINE STRUCTURE AND RESISTIVITY VARIATION OF ANOMALIES

Rambabu P. Ranganayaki, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 23, 1981, Ser. No. 323,502
Int. Cl.[4] G01V 3/08, 3/38
U.S. Cl. 324—350 7 Claims


INPUT E_x, E_y, H_x, H_y FOR SITES ALONG LINES OF EXPLORATION X AND Y
FILTER AT SUCCESSIVELY LOWER FREQUENCIES
1000 100 10 ..... 0001 CPS
DETERMINE ABSOLUTE VALUE OF Z_{xx} Z_{xy} Z_{yx} Z_{yy}
DETERMINE PHASE OF Z_{xx} Z_{xy} Z_{yx} Z_{yy}
REPEAT FOR ALL FREQUENCIES
REPEAT FOR ALL SITES ALONG X
REPEAT FOR ALL SITES ALONG Y
SELECT EQUAL VALUES OF β DET
SELECT EQUAL VALUES OF ϕ DET
PLOT CONTOURS OF β DET AS FUNCTION OF X AND F
PLOT CONTOURS OF ϕ DET AS FUNCTION OF X AND F
PLOT CONTOURS OF β DET AS FUNCTION OF X AND Y FOR SUCCESSIVE FREQUENCIES
PLOT CONTOURS OF ϕ DET AS FUNCTION OF X AND Y FOR SUCCESSIVE FREQUENCIES

1. In magnetotelluric exploration wherein orthogonal measurements E_x and E_y of the earth's telluric field and orthogonal measurements H_x and H_y of the earth's magnetic field are made along a line of exploration, said magnetotelluric measurements being related to the impedance of the earth by the determinant of the matrix of impedance tensor components:

$$\begin{bmatrix} E_x \\ E_y \end{bmatrix} = \begin{bmatrix} Z_{xx} & Z_{xy} \\ Z_{yx} & Z_{yy} \end{bmatrix} \begin{bmatrix} H_x \\ H_y \end{bmatrix}$$

where

$$\begin{bmatrix} Z_{xx} & Z_{xy} \\ Z_{yx} & Z_{yy} \end{bmatrix}$$

is the impedance tensor relating the earth's electric fields E_x, E_y to the earth's magnetic fields H_x, H_y, the method of plotting said magnetotelluric measurements to distinguish the structure of resistivity anomalies and separate near surface and depth anomalies comprising:

filtering magnetotelluric measurements of E_y, E_y H_x and H_y taken at sites along lines of exploration x and y to produce measurements of E_x, E_y, H_x and H_y for a plurality of successively low frequencies, each successively lower frequency representing a successively lower depth;

determining the phase (ϕ_{DET}) of the determinant of the matrix of impedance tensor components for said filtered measurements;

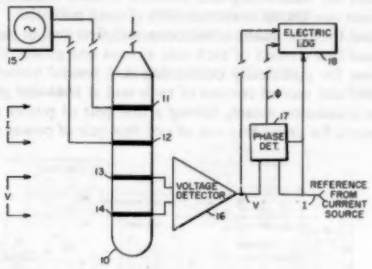
plotting contours of equal values of the phase of said determinant as a function of the points on said line of exploration at which said measurements were made, for each of said successively lower frequencies.

4,686,477

MULTIPLE FREQUENCY ELECTRIC EXCITATION METHOD AND IDENTIFYING COMPLEX LITHOLOGIES OF SUBSURFACE FORMATIONS

Wyatt W. Givens, Dallas, and Edgar A. Bowden, Arlington, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 30, 1985, Ser. No. 781,628
Int. Cl.[4] G01V 3/24, 3/06
U.S. Cl. 324—366 13 Claims



1. A method for identifying complex lithologies of a rock formation comprising the steps of:

(a) exciting at least a portion of said rock formation with a multi-frequency electric current, containing a plurality of frequencies such that all of said frequencies simultaneously excite said portion of said rock formation

(b) measuring the resulting voltage in said portion of said rock formation,

(c) determining the phase and amplitude of the measured voltage at each of the plurality of simultaneous frequencies included in said multi-frequency electric current,

(d) determining the resistivity of said portion of said rock sample at each plurality of simultaneous frequencies from the amplitude of said multi-frequency current at each of said plurality of simultaneous frequencies and said determinations of phase and amplitude for said measured voltage,

(e) recording said resistivity and said phase as a function of frequency,

(f) characterizing said rock formation as a clean rock when said resistance remains constant and said phase is negligible as a function of exciting current frequency,

(g) characterizing said rock formation as a low resistivity, high surface area, clay bearing rock when said resistance remains constant and said phase is a negative value which decreases in magnitude as said exciting current frequency increases, and

(h) characterizing said rock formation as a low resistivity, pyrite-bearing rock when said resistance decreases as said exciting current frequency increases and said phase is a negative value which increases in magnitude as said exciting current frequency increases.

4,686,478

TESTING DEVICE FOR DETECTING CONTACT CHATTER IN ELECTRICAL COMPONENTS WITH MOVABLE CONTACTS, SUCH AS RELAYS

Robert H. Jabs, Greensburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 5, 1985, Ser. No. 741,424
Int. Cl.[4] G01R 31/12, 31/02; G08B 21/00
U.S. Cl. 324—420 20 Claims

1. A testing device for detecting contact chatter during vibration of electrical components having at least one group of contacts, each group including a first fixed contact, a second fixed contact spaced apart from the first fixed contact, and a movable group disposed between the first and second contacts, comprising:

bipolar power supply means having first and second termi-

nals for supplying power at a potential that is positive with respect to ground at said first terminal and for supplying power at a potential that is negative with respect to ground at said second terminal;

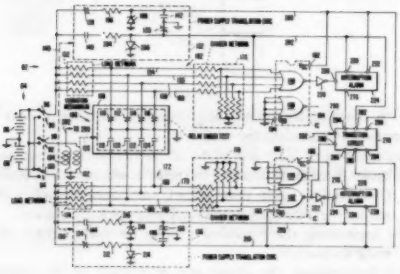
switch means having first and second switch ports for connecting said first terminal to said first switch port and said second terminal to said second switch port or said first terminal to said second switch port and said second terminal to said first switch port;

means for maintaining said movable contact of each said at least one group at substantially ground potential;

means for electrically connecting said first switch port and said first contact of each said at least one group;

means for electrically connecting said second switch port and said second contact of each said at least one group;

first translation means, having a first pair of power output ports, for grounding one of said first pair of power output



ports and maintaining the other at a predetermined voltage having the same polarity as the voltage at said first switch port, the grounded one of said first pair of power output ports changing when the polarity of the voltage at said first switch port changes;

second translation means, having a second pair of power output ports, for grounding one of said second pair of power output ports and maintaining the other at a predetermined voltage having the same polarity as the voltage at said second switch port, the grounded one of said second pair of power output ports changing when the polarity of the voltage at said second switch port changes;

first indicator means, connected to said first contact of each said at least one group and to said first pair of power output ports, for detecting contact chatter; and

second indicator means, connected to said second contact of each said at least one group and said second pair of power output ports, for detecting contact chatter.

4,686,479

APPARATUS AND CONTROL KIT FOR ANALYZING BLOOD SAMPLE VALUES INCLUDING HEMATOCRIT

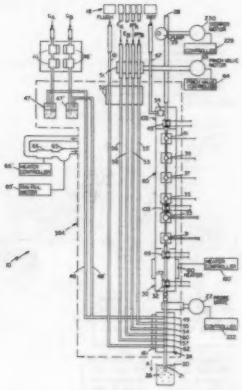
Chung C. Young, 145 Buckskin Dr., Weston, Mass. 02193; Robert L. Coleman, 65 Indian Head Rd., Framingham, Mass. 01701; Sheila M. Sullivan, 71 Marlboro St., Wollaston, Mass. 02170; John F. Grimes, 30 Fenelon Rd., Framingham, Mass. 01701; Ferdnand Baumeister, One Winchester St., Nashua, N.H. 03063; Robert MacIndoe, 18 Prunier St., P.O. Box 299, Linwood, Mass. 01525; Lou Catalano, 31 Frankland Rd., Ashland, Mass. 01721; Pat Coppola, Five Cedar St., Burlington, Mass. 01803; Fred Spaziani, 41 Fair Oaks Dr., Lexington, Mass. 02173; Guy Rodomista, Nine Blueberry Hill Rd., Natick, Mass. 01760, and James E. Fowler, 54 Barnard Ave., Watertown, Mass. 02172

Filed Jul. 22, 1985, Ser. No. 757,573

Int. Cl.[4] G01N *27/02*

U.S. Cl. 324—439 **30 Claims**

10. Apparatus for determining hematocrit value in a blood sample comprising: (1) means for providing a fluid flow path; (2) means in said flow path for providing an electrical signal representative of the conductivity of liquid passing along said flow path; (3) means in said flow path for providing a signal representative of the concentration of an ion species in liquid passing along said flow path; (4) means for introducing said blood sample into said flow path to obtain a signal representative of sample conductivity and of sample ion species concentration; (5) means for introducing into said flow path a standardizing solution having a known concentration of an ion



species and having a conductivity representative of a known equivalent hematocrit value; (6) means for deriving a signal representative of a tentative sample hematocrit value from the sample conductivity signal, with reference to the standardizing conductivity signal and to the standardizing equivalent hematocrit value; and (7) means for correcting said tentative sample hematocrit value with reference to said standardizing and sample ion concentration signals and to said known standardizing ion concentration.

4,686,480

WAVE GENERATION CIRCUIT FOR A PULSE-WIDTH MODULATION INVERTER

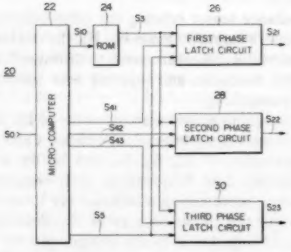
Masayuki Katto, Nagoya, and Eiichi Sugishima, Nagoya, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation-in-part of Ser. No. 550,216, Nov. 9, 1983, abandoned. This application Oct. 1, 1984, Ser. No. 656,734

Claims priority, application Japan, Nov. 17, 1982, 57-201529

Int. Cl.[4] G06F *3/00*; H03K *5/00*

U.S. Cl. 328—62 **12 Claims**



1. A wave generation circuit for a pulse width modulation inverter for receiving an input signal of a predetermined frequency and for generating a plurality of waves of differing phases which are modulated so as to form driving signals for

switching elements in the pulse width modulation inverter, comprising:

a memory means for storing reference waveform data for the generated waves at a plurality of addresses;

an operation means for receiving said input signal and for providing a phase address signal and a phase latch command signal for each of said phases and an additional output timing signal in response to said input signal, the difference between the addresses indicated by said phase address signals corresponding to the phase difference between said generated waves, and for transmitting said phase address signals to said memory means so as to cause said memory means to output reference waveform data corresponding to each phase stored at the addresses indicated by said address signals;

a plurality of phase latch means each having a plurality of latch elements, each of said latch means receiving its respective phase latch command signal from said operation means in synchronism with its respective phase address signal so as to latch the corresponding stored reference waveform data comprising a plurality of parallel data bits equal in number to said plurality of latch elements and received from said memory means and said plurality of phase latch means receiving said output timing signal from said operation means when the corresponding stored reference waveform data for each phase is latched so as to cause said plurality of phase latch means to output the latched data as a plurality of parallel data bits equal in number to said plurality of latch elements;

wherein said operation means provides new phase address signals at predetermined intervals so as to cause said plurality of phase latch means to transmit waveform data forming the generated wave for each phase.

4,686,481

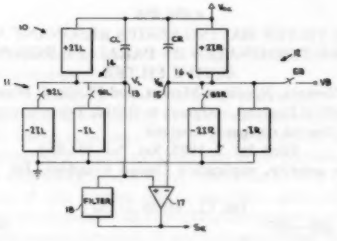
PHASE DETECTOR APPARATUS INCLUDING CHARGE PUMP MEANS

Neil R. Adams, San Francisco, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Feb. 1, 1985, Ser. No. 697,545

Int. Cl.[4] H03D *13/00;* **H03K** *9/06, 5/13*

U.S. Cl. 328—133 **21 Claims**



1. An apparatus for generating an output signal in response to a sequence of control signals, comprising:

first integrating means, coupled to receive a first subset of the sequence of control signals, for generating a first node voltage;

second integrating means, coupled to receive a second subset of the sequence of control signals, for generating a second node voltage;

output means, coupled to receive said first node voltage and said second node voltage, for generating the output signal in response to the difference between said first node voltage and said second node voltage; and

filter means, coupled to receive said output signal from said output means and to said first integrating means, for supplying a current to said first integrating means proportional to the difference between said first node voltage and said second node voltage to vary said first node voltage.

4,686,482

CLOCK SIGNAL ARRANGEMENT FOR REGENERATING A CLOCK SIGNAL

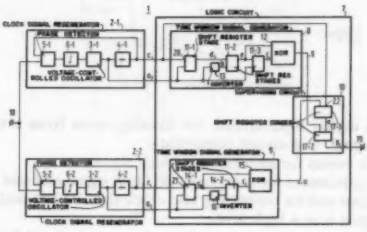
Herman Zoetman, and Robert J. M. Verbeek, both of Hilversum, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 7, 1985, Ser. No. 785,308

Claims priority, application Netherlands, Aug. 13, 1985, 8502234

Int. Cl.[4] H03K *5/00, 1/17, 7/00*

U.S. Cl. 328—164 **5 Claims**



1. A clock signal reproduction circuit for reproducing an input clock signal comprising:

first and second clock signal regenerators, each having a phase control loop, coupled in parallel to an input terminal for receiving said input clock signal, said first and second clock signal regenerators each having a first output for outputting a regenerated clock signal and a second output for outputting a frequency-divided regenerated clock signal which is formed by frequency dividing said regenerated clock signal by a predetermined frequency dividing factor, which predetermined frequency dividing factor is the same for both clock signal regenerators;

first and second time window signal generators coupled at their inputs to the outputs of said first and second clock signal regenerators respectively, said first time window signal generator having a time window signal generator output for outputting a time window signal whose period is directly proportional to the duration of the frequency-divided regenerated clock signal of said first clock signal regenerator and whose phase angle relative to the phase of the frequency-divided regenerated clock signal of said first clock signal regenerator is substantially maintained at a constant value, and said second time window signal generator having a time window signal generator output for outputting a time window signal whose period is directly proportional to the duration of the frequency-divided regenerated clock signal of said second clock signal regenerator and whose phase angle relative to the phase of the frequency-divided regenerated clock signal of said second clock signal regenerator is substantially maintained at a constant value; and

a supervising circuit having a first input coupled to the second output of said first clock signal regenerator, a second input coupled to the time window signal generator output of said first time window signal generator, a third input coupled to the time window signal generator output of said second time window signal generator, and a supervising circuit output which serves as the output for said clock signal reproduction circuit, said supervising circuit outputting a reproduced clock signal only when the time difference between said time window signals resulting from a phase difference between the phase angles of said time window signals is less than a predefined threshold value, where said threshold value is a portion of the dura-

tion of the frequency-divided regenerated clock signal from the second output of said first clock signal regenerator.

4,686,483

DIGITAL FILTER CIRCUIT

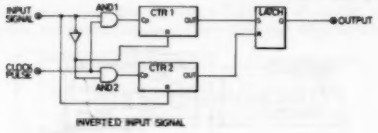
Isao Isshiki, and Shinichiro Takahashi, both of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jan. 30, 1986, Ser. No. 824,891

Claims priority, application Japan, Jan. 30, 1985, 60-10564[U]

Int. Cl.[4] H03K *17/16, 21/40*

U.S. Cl. 328—165 **6 Claims**



1. A digital filter circuit, for filtering noise from a bilevel input signal, said circuit comprising:

clock means for generating a clock signal;

first gate means for receiving said input signal and said clock signal and for outputting said clock signal when said input signal is at a high level;

first counter means for receiving the output of said first gate means as a clock input, for providing a first output signal at a predetermined count of said clock input, but said first counter means being reset anytime from noise by said going to a low level;

latching means being set in response to said first output signal of said first counter means;

inverting means for receiving said input signal and generating an inverted input signal;

second gate means for receiving said inverted input signal and said clock signal and for outputting said clock signal when said input signal is at a low level;

second counter means for receiving the output of said second gate means as a clock input, and for providing a second output signal at a predetermined count of said clock input but, said second counter means being reset anytime from noise by said input signal going to a high level;

said latching means being reset in response to said second output signal of said second counter means, whereby said latching means provides a filtered signal from the predetermined counts of said first and second counters.

4,686,484

PHASE DETECTION CIRCUIT

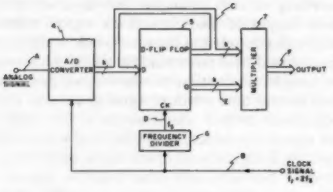
Susumu Otani, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Apr. 11, 1986, Ser. No. 850,747

Claims priority, application Japan, Apr. 17, 1985, 60-81932

Int. Cl.[4] H04L *7/06*

U.S. Cl. 329—109 **14 Claims**



1. A phase detection circuit for detecting the difference in phase between a reference clock signal and an analog signal including a clock component signal, comprising:

analog-to-digital converter means for sampling the analog signal at the frequency of the reference clock signal and for providing a k-bit first digital signal;

delay circuit means responsive to said converter means for sampling the first digital signal at a frequency equal to one-half the frequency of the reference clock signal and for providing a k-bit second digital signal; and

multiplier means jointly responsive to said converter means and said delay circuit means for multiplying the first digital signal by the second digital signals to provide a data signal which is representative of the phase difference.

4,686,485

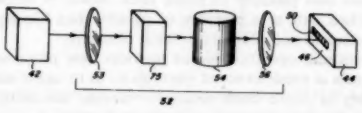
OPTICAL INJECTION LOCKING OF LASER DIODE ARRAYS

Lew Goldberg; Henry F. Taylor, both of Alexandria, Va., and Joseph F. Weller, Fort Washington, Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 7, 1985, Ser. No. 795,796

Int. Cl.[4] H01S *3/00*

U.S. Cl. 330—4.3 **8 Claims**



1. An apparatus for amplifying a laser beam comprising:

a master laser that produces the laser beam;

a laser array having an array facet containing the edge of a single array junction plane, said array being biased above threshold; and

means for shaping and focusing the laser beam produced by the master laser so that the laser beam irradiates the edge of the single array junction plane causing the laser array to be injection locked.

4,686,486

ACTIVE FILTER HAVING SERIES RESONANT ACTIVE FILTER TERMINATED BY PARALLEL RESONANT ACTIVE FILTER

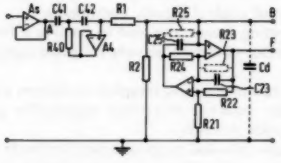
Alan J. Greaves, Needham Market, and Phillip J. Hunter, Kirton, both of England, assignors to British Telecommunications public limited company, England

Filed Jul. 5, 1985, Ser. No. 751,853

Claims priority, application United Kingdom, Jul. 5, 1984, 8417159

Int. Cl.[4] H03F *3/181*

U.S. Cl. 330—107 **10 Claims**



1. A filter comprising:

a series resonant active filter section terminated by a parallel resonant active filter section,

the series resonant active filter section having an impedance

equivalent to the series combination of capacitance, resistance and frequency dependent negative resistance, and

the parallel resonant active filter section having an impedance equivalent to the parallel connection of at least resistance and frequency dependent negative resistance,

in which the frequency dependent negative resistance, capacitance and resistance of the series resonant active filter section are provided by an arrangement of components comprising a capacitive potential divider connected between a low impedance input to the filter and an intermediate connection point, and a unity gain amplifier having its input connected to the intermediate connection point and its output connected via a first resistance to the tapping point of the divider,

the intermediate connection point being connected via a second resistance to the parallel resonant active filter section.

4,686,487

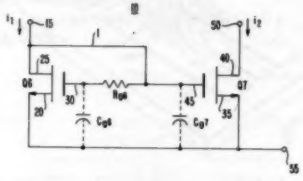
CURRENT MIRROR AMPLIFIER

Jonathan S. Radovsky, Minneapolis, Minn., assignor to Commodore Business Machines, Inc., West Chester, Pa.

Filed Jul. 28, 1986, Ser. No. 889,838

Int. Cl.[4] H03F *3/04*

U.S. Cl. 330—288 **13 Claims**



1. A current mirror amplifier having an associated frequency response comprising:

an input terminal for receiving an input current;

first and second amplifying devices, each having an associated transconductance and a drain terminal, a source terminal, and a gate terminal, said drain terminal of said first amplifying device being connected to said input terminal of said current mirror amplifier, and said source terminal of said second amplifying device being connected to said source terminal of said first amplifying device.

resistive means, having an associated value of equivalent resistance, connected between said gate terminals of said first and second amplifying devices for adjusting the frequency response of said current mirror amplifier;

feedback means connected between said gate terminal of said second amplifying device and said input terminal of said current mirror amplifier for forcing said first amplifying device to accept said input current, and for simultaneously forcing said second amplifying device to accept an output current depending on said input current and the frequency response to said current mirror amplifier as determined by said resistive means; and

an output terminal connected to said drain terminal of said second amplifying device for accepting an output current responsive to said input current.

4,686,488

FRACTIONAL N FREQUENCY SYNTHESIZER WITH MODULATION COMPENSATION

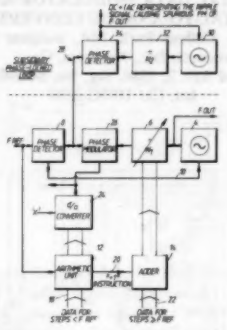
Colin Attenborough, Cambridgeshire, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Jan. 31, 1986, Ser. No. 824,805

Claims priority, application United Kingdom, Feb. 6, 1985, 8503013

Int. Cl.[4] H03L *7/06*

U.S. Cl. 331—2 **7 Claims**



1. A frequency synthesiser of the fractional N type comprising a primary voltage controlled oscillator for producing an output signal which is afforded to a phase detector via a primary divider to provide a control signal for the primary voltage controlled oscillator in the presence of a phase difference between a reference signal from a reference source and the signal afforded thereto from the primary divider, the division ratio of which may be varied in a fractional N mode to vary the frequency of the output signal in frequency steps smaller than the frequency of the reference signal and wherein a ripple signal tending thereby to be produced and causing frequency modulation of the output signal is compensated by a phase modulator, arranged to couple the primary divider and the phase detector and to receive a drive signal wherein the synthesiser further comprises a subsidiary phase lock loop arranged to provide an enhanced representation of the ripple signal in dependence upon the signal afforded to the phase detector from the phase modulator, and a digital to analogue converter arranged to provide the drive signal for the phase modulator in dependence upon the enhanced representation of the ripple signal.

4,686,489

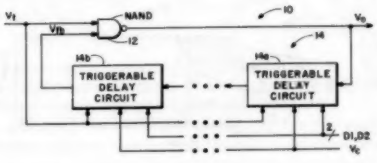
TRIGGERED VOLTAGE CONTROLLED OSCILLATOR USING FAST RECOVERY GATE

George J. Caspell, Hillsboro, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 16, 1986, Ser. No. 875,030

Int. Cl.[4] H03K *3/023, 3/03*

U.S. Cl. 331—57 **10 Claims**



1. A triggered oscillator comprising:

logic gate means for generating an oscillator output signal of state set according to the state of a feedback signal; and

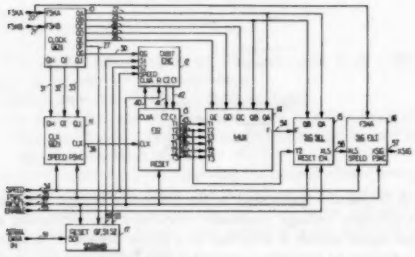
feedback means for generating said feedback signal of state set in delayed response to the states of said oscillator output signal and a trigger signal, wherein said logic gate means comprises a differential logic gate and wherein said trigger signal, said feedback signal, and said oscillator output signal are all differential signals.

4,686,490

DIGITAL DATA MODULATOR AND DIGITAL-TO-ANALOG CONVERTER

John R. Cressey, College Park, Md., assignor to Hayes Microcomputer Products, Inc., Norcross, Ga.

Filed Apr. 7, 1986, Ser. No. 848,988
Int. Cl.[4] H03C *3/00*
U.S. Cl. 332—1 **47 Claims**



1. A digital modulator for generating a modulated analog waveform at a desired frequency, comprising:

a first clock having a frequency of N times said desired frequency, N being an integer greater than one;

divider means connected to said first clock for providing a second clock of said desired frequency by dividing the frequency of said first clock by N;

shifting means connected to said divider means for providing a plurality of parallel outputs by shifting said second clock at the frequency of said first clock;

conversion means connected to said shifting means and responsive to said plurality of parallel outputs for providing a pulsewidth-modulated signal at a predetermined frequency, said predetermined frequency being greater than said desired frequency; and

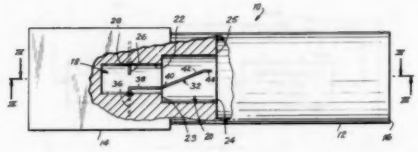
integration means connected to said conversion means for providing said analog waveform at said desired frequency by integrating said pulsewidth-modulated signal.

4,686,491

DUAL PROBE SIGNAL RECEIVER

H. Taylor Howard, San Jose, Calif., assignor to Chaparral Communications, San Jose, Calif.

Filed Oct. 22, 1985, Ser. No. 790,235
Int. Cl.[4] H01P *1/161, 5/10*
U.S. Cl. 333—21 A **11 Claims**



7. A signal receiver for receiving orthogonally polarized signals, comprising:

a waveguide having an injection end for injecting the signals thereinto and an oppositely arranged receiving end;

a rectangular cavity attached to said receiving end of said waveguide;

a first probe protruding into said rectangular cavity for receiving one polarization of an orthogonally polarized signal; and

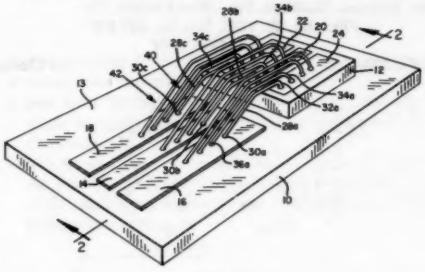
a second probe extending into said rectangular cavity at a location opposite said first probe for receiving the other polarization of said orthogonally polarized signal, said second probe being formed having a receiver probe portion arranged perpendicularly to a longitudinal axis of said waveguide and located substantially at said receiving end of said waveguide and connected at one end to a signal output through a transmission line formed by a conductor of said second probe and a wall of said rectangular cavity that forms a ground plane for said conductor, said receive probe portion and said transmission line being mutually connected at an area of low impedance within said waveguide, relative to said orthogonally polarized signals.

4,686,492

IMPEDANCE MATCH CONNECTION USING MULTIPLE LAYERS OF BOND WIRES

H. Erwin Grellmann, Beaverton, and Leonard A. Roland, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Mar. 4, 1985, Ser. No. 708,129
Int. Cl.[4] H01P *5/00*
U.S. Cl. 333—33 **14 Claims**



1. A very high frequency electrical connection between a pair of electrical devices comprising a plurality of layers of bond wires, each layer having a signal-carrying line flanked on both sides thereof by a ground line, each electrical device having a plurality of contact points corresponding to the signal-carrying line and the ground lines between which respective bond wires are attached to connect the pair of electrical devices.

4,686,493

WIDEBAND SHORT SLOT HYBRID COUPLER

Donald C. D. Chang, and Mon N. Wong, both of Torrance, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 782,677, Oct. 2, 1985. This application Mar. 27, 1986, Ser. No. 844,651
Int. Cl.[4] H01P *5/18*
U.S. Cl. 333—113 **11 Claims**

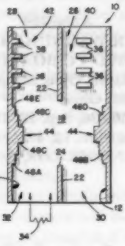
1. A wideband waveguide hybrid coupler, comprising:

first and second waveguides having rectangular cross-sections and comprising respective longwalls and sidewalls, said waveguides being disposed in contiguous relationship and sharing a sidewall as a common dividing wall;

means for coupling electromagnetic energy within a wide frequency band between said first and second waveguides; and

said coupling means comprising an aperture in said common

wall and coupling enhancement sections engaging each of said waveguides via a sidewall in respective ones of said waveguides, said enhancement sections being tuned to provide frequency responses in particular frequency subbands within said wide frequency band to provide a stag-



ger-tuned composite frequency response for said coupling means;

whereby said wideband coupler provides low attenuation to electromagetic signals having signal frequencies within said wide frequency band.

4,686,494

CAVITY RESONATOR COUPLING TYPE POWER DISTRIBUTOR/POWER COMBINER COMPRISING COUPLED INPUT AND OUTPUT CAVITY RESONATORS

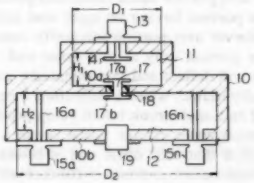
Yoshiaki Kaneko, Yokohama; Toshiyuki Saito, and Naofumi Okubo, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 18, 1984, Ser. No. 571,811

Claims priority, application Japan, Jan. 26, 1983, 58-011063; Jan. 26, 1983, 58-011064

Int. Cl.[4] H01P *7/06;* **H03H** *7/48*

U.S. Cl. 333—137 **25 Claims**



1. A cavity resonator coupling type power distributor/-power combiner selectable to function as one of a distributor and a combining unit in conjunction with multiple amplifiers, said power distributor/power combiner comprising:

first cavity resonator means, having a single coupling terminal and an axis, operatively resonating in a first transverse mode with a first resonant frequency;

second cavity resonator means, having a plurality of coupling terminals and having an axis in common with the axis of said first cavity resonator means, operatively resonating in a second transverse mode of a higher order than the first transverse mode and with a second resonant frequency, different than the first resonant frequency, said second cavity resonator means performing electrical distribution or combination symmetrically with respect to the axis; and

coupling means, disposed symmetrically with respect to the axis and between said first and second cavity resonator means, for electromagnetically coupling said second cavity resonator means with said first cavity resonator means.

4,686,495

FINELY VARIABLE DELAY LINE INCORPORATING COARSELY AND FINELY VARIBLE DELAY LINE ELEMENTS

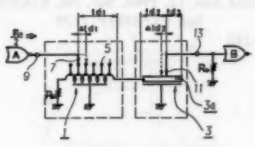
Kazuo Kameya, Tsurugashima, Japan, assignor to Elmec Corporation, Saitama-Ken, Japan

Continuation of Ser. No. 872,110, Feb. 18, 1986, abandoned, and a continuation of Ser. No. 844,100, Feb. 18, 1986, abandoned. This application Feb. 19, 1986, Ser. No. 830,837

Claims priority, application Japan, Feb. 18, 1985, 60-31338

Int. Cl.[4] H03H *7/34;* **H01P** *9/00*

U.S. Cl. 333—156 **9 Claims**



1. A finely variable delay line, for providing a delay time in transmission of an input signal, comprising:

(a) first variable delay line means for providing a first delay time in transmission of said input signal, said first delay time being variable in first predetermined increments;

(b) second variable delay lines means, connected in series with said first variable delay line means, for providing a second delay time in transmission of said input signal, said second delay time being variable in second predetermined increments which are substantially smaller than said first predetermined increments;

(c) said second delay means comprising first and second elements, the first element of which splits said input signal into an output signal and a reflection signal, said reflection signal being repeatedly transmitted from said first element to said second element and back again, wherein each time said reflection signal is transmitted back to said first element, a portion of said reflection signal is added to said output signal, thereby increasing said second delay time.

4,686,496

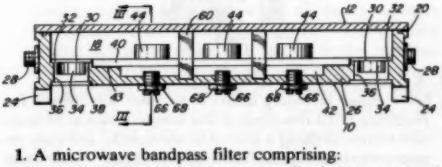
MICROWAVE BANDPASS FILTERS INCLUDING DIELECTRIC RESONATORS MOUNTED ON A SUSPENDED SUBSTRATE BOARD

Barry A. Syrett, Ottawa, and Paul A. Kennard, Nepean, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Apr. 8, 1985, Ser. No. 721,092

Int. Cl.[4] H01P *1/20*

U.S. Cl. 333—202 **20 Claims**



1. A microwave bandpass filter comprising:

a waveguide of rectangular cross-section having conductive upper, lower, and side walls;

an insulating board in the waveguide having upper and lower surfaces substantially parallel to and spaced from the upper and lower walls, the lower and side walls defining a well beneath the board and supporting the board around substantially its entire periphery;

a plurality of dielectric resonators supported by the board and spaced along the waveguide;

a plurality of tuning screws each extending through the lower wall into the well beneath a respective one of the dielectric resonators; and

means for coupling microwave signals to and from the resonators, each means for coupling microwave signals comprising a coupling conductor on the board directly over the well adjacent to a periphery of a respective resonator.

4,686,497

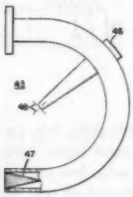
ADJUSTABLE WAVEGUIDE SHORT CIRCUIT

Douglas D. Tang, Chelmsford, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Jun. 12, 1986, Ser. No. 873,576

Int. Cl.[4] H01P *1/28*

U.S. Cl. 333—253 **9 Claims**



1. An adjustable waveguide short circuit comprising a waveguide having a first portion coupled to a second portion,

said first portion being adapted to receive and/or transmit a signal,

said second portion being formed along an arcuate path;

a flat vane, occupying a portion of said waveguide, traversable along said arcuate path and adaptable to bifurcate said waveguide with near full penetration thereinto to cause total reflection of said signal by making said portion a waveguide beyond cutoff; and

means for stepping said flat vane along said arcuate path.

4,686,498

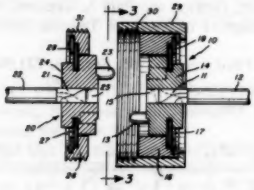
COAXIAL CONNECTOR

Kenneth Carr, Harvard, and Arthur A. Blaisdell, Ashland, both of Mass., assignors to M/A-COM, Inc., Burlington, Mass.

Filed Apr. 15, 1985, Ser. No. 723,304

Int. Cl.[4] H01P *1/04*

U.S. Cl. 333—260 **17 Claims**



1. A coaxial connector comprising:

a first member including means at an outer side thereof for receiving a first transmission line means, means at an inner side thereof defining a section of waveguide, and coax-to-microtstip-to-antipodal-finline-to-waveguide transition means disposed intermediate said first transmission line means and said section of waveguide;

a second member including means at an outer side thereof for receiving a second transmission line means, means at an inner side thereof defining a section of waveguide, and coax-to-microstrip-to-antipodal-finline-to-waveguide transition means disposed intermediate said second transmission line means and said second member section of waveguide;

and means for supporting the first and second members with the inner sides thereof in facing relationship including means for holding the sections of waveguide of said first and second members, respectively, in alignment.

4,686,499

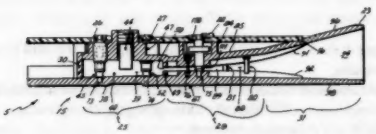
POLICE RADAR WARNING RECEIVER WITH CANTILEVERED PC BOARD STRUCTURE

Gregory R. Furnish, Mason, Ohio, assignor to Cincinnati Microwave, Inc., Cincinnati, Ohio

Division of Ser. No. 656,026, Sep. 28, 1984, Pat. No. 4,613,989. This application Mar. 12, 1986, Ser. No. 838,931

Int. Cl.[4] H05K *1/18, 5/02, 7/12*

U.S. Cl. 333—230 **5 Claims**



1. In combination:

(a) a microwave circuit including:

a first wall having an inner surface;

a second wall spaced from said first wall and confronting said inner surface thereof to define a microwave cavity therebetween, said second wall having an outer surface;

circuit component means having opposite ends, one end of which projects toward said inner surface of said first wall, another end of which projects outwardly of said cavity through a hole in said second wall; and

(b) a circuit board secured with respect to said microwave circuit in overlying relationship to said outer surface of said second wall exteriorly of said cavity, said circuit board including:

a cantilever arm portion and a remainder portion, said cantilever arm portion having an inner end and a distal end, said cantiliever arm portion integrally connected to said remainder portion only at said inner end, whereby said distal end will deflect and said remainder portion will not substantially deflect when a deflecting force is applied to said distal end, said circuit board being positioned relative to said microwave circuit when secured with respect thereto, such that said distal end is positioned atop the circuit component means and in contact with said another end thereof so that said component means provides said deflecting force to thereby deflect said distal end, whereby said distal end cooperates with at least said first wall to maintain said circuit component means one end in contact with said inner surface of said first wall.

4,686,500

ELECTROMAGNETIC RELAY

Tatsumi Ide; Masayuki Morimoto, and Kei Chiba, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Jan. 30, 1986, Ser. No. 824,131

Claims priority, application Japan, Jan. 31, 1985, 60-17364; Jul. 5, 1985, 60-148643

Int. Cl.[4] H01H *67/02*

U.S. Cl. 335—128 **11 Claims**

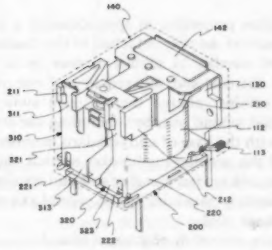
1. An electromagnetic relay comprising:

a first stationary contact member made of electrically conductive material and including a center portion with a wide plate region, a gripped portion extending above said center portion, a stationary contact portion which extends in a substantially perpendicular direction from the upper end of said center portion and which has a first stationary

electrical contact thereon, an inserting portion extending in the substantially perpendicular direction from the lower end of said center portion, and an L-shaped terminal extending in the substantially perpendicular direction from the lower end of said center portion;

a second stationary contact member made of electrically conductive material and including a center portion, a gripped portion extending above said center portion, a stationary contact portion which extends in the substantially perpendicular direction from the upper end of said gripped portion and which has a second stationary electrical contract thereon, an inserting portion extending in the substantially perpendicular direction from the lower end of said center portion, and an L-shaped terminal extending in the substantially perpendicular direction from the lower end of said center portion;

an insulative base member which includes a hollow tube portion having a core therein and having a coil wound on said tube, a first base on one end of said tube portion and having first and second gripping portions for securing said gripped portions of said first and second stationary contact members respectively, said first base of said base member further comprises a first and second side wall portions extending from said first and second gripping



portions, respectively, a partition wall for connecting these side wall portions to each other and for separating one end of said core from said first stationary contact, and a second base on the other end of said tube portion, said first and second bases being substantially parallel to each other, said second base having first and second grooves for receiving and securing said inserting portions of said first and second stationary contact members respectively and having first and second guide grooves for receiving and guiding said terminals of said first and second stationary contact members respectively;

a yoke which is magnetically connected at one end thereof to one end of said core mounted on said base;

an armature magnetically connected at one end thereof to the other end of said yoke, said armature being mounted to move toward or away from the other end of said core; and

a movable contact member made of mechanically flexible and electrically conductive material having a movable arm portion including a movable electrical contact, said movable contact being positioned between said first and second stationary contacts to selectively contact either said first or said second stationary contact in response to the movement of said armature moving toward or away from said other end of said core.

4,686,501

ELECTROMAGNETIC ACTUATOR COMPRISING AT LEAST TWO DISTINCT MAGNETIC CIRCUITS

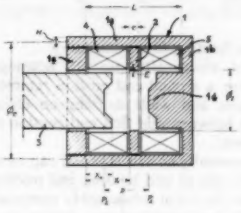
René G. Palmier; Pierre P. Perrier, and Sing K. Phounsombath, all of Ramonville-Saint-Agne, France, assignors to Equipements Automobiles Marchal, Issy-les-Moulineaux, France

Filed Oct. 11, 1984, Ser. No. 660,003

Claims priority, application France, Oct. 14, 1983, 83 16443; Feb. 7, 1984, 84 01830

Int. Cl.[4] H01F 7/08

U.S. Cl. 335—256 **7 Claims**



1. An electromagnetic actuator comprising:

an outer armature having a cylindrical shape and comprising a base;

an inner armature positioned substantially along the axis of the outer armature, the two armatures being moveable relative to each other, during a stroke of the actuator, between a first position in which the movable armature is at a maximum distance from the base, and a second position in which the moveable armature is located at the end of the stroke toward the base;

said inner and outer armatures defining a principal magnetic circuit having an air gap comprised of a variable portion between the inner armature and the base of the outer armature, and an essentially constant portion between the two armatures;

the reluctance of said principal circuit having a maximum value when the inner armature is at the maximum distance from the base of the outer armature, and a minimum value when the inner armature is located at the end of the stroke toward the base of the outer armature,

a ferro-magnetic separator including a radial portion within the outer armature, said magnetic separator establishing a secondary magnetic circuit in which lines of flux pass through the radial portion of the magnetic separator,

the magnetic separator cooperating with the movable armature to establish a variable air gap to cause a variation of reluctance of the secondary magnetic circuit which is shifted along the stroke with respect to the variation of reluctance of the principal magnetic circuit, the variations of reluctance of the principal and secondary magnetic circuits during the course of an operating stroke of the actuator being monotone variations in the same direction, and

first and second coil elements within the outer armature, and

wherein the magnetic separator has the form of an annular washer of substantially constant thickness e, and when the air gap of the main magnetic circuit is at a minimum, the variable portion of the air gap is constituted by a single cylindrical space of substantially constant width E defined by the separator.

4,686,502
TERMINAL BRACKET STRUCTURE FOR A CURRENT LIMITING FUSE

Delbert R. Parker, and Daren A. Clark, both of Centralia, Mo., assignors to A. B. Chance Company, Centralia, Mo.

Filed Jun. 30, 1986, Ser. No. 879,969
Int. Cl.[4] H01H *85/02*
U.S. Cl. 337—252 9 Claims

1. A current limiting fuse comprising:

an elongated, electrically insulated housing having a first end portion, a second end portion remote from said first end portion, and walls defining an elongated chamber extending between said first end portion and said second end portion;

a pair of electrically conductive end cap means each fixedly coupled to one of said housing end portions;

an elongated electrical subassembly comprising at least one electrically insulative support having opposed end segments, a pair of terminal elements each presenting an outer periphery and respectively fixed to one of said end segments of said at least one support, and fusible element means carried by said at least one support and electrically connected to both of said terminal elements; and

flexible structure mounting said electrical subassembly longitudinally in said chamber of said housing,

said flexible structure being a pair of leg members each respectively electrically and mechanically connecting one of said terminal elements to one of said end cap means,

each of said leg members including portions swingable in an arc to permit variation in the distance between the terminal elements and the corresponding end cap means while retaining an electrical connection between the terminal elements and the end cap means as the length of the housing is varied due to the effects of thermal expansion and contraction,

each of said leg members being the only mechanical interconnection between the respective terminal element and the corresponding end cap means to enable movement of the terminal elements relative to the end cap means with a minimum of mechanical stress,

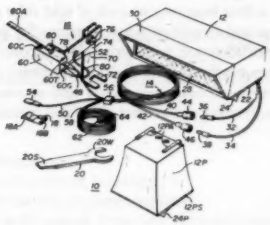
each of said leg members including a swingable section extending radially inwardly from the peripheral edge of the respective terminal element, and a connection portion adjacent the end of said swingable section remote from said peripheral edge.

4,686,503
METHOD FOR RETROFITTING AUTOMOBILES WITH DECELERATION WARNING LIGHT

Terry G. Miller, 1005 LaVilla Rd., Punta Gorda, Fla. 33950

Filed Dec. 16, 1985, Ser. No. 809,477
Int. Cl.[4] B60Q *1/26*
U.S. Cl. 340—71 2 Claims

1. A method of retrofitting in a conventional automobile of the type that has a driver-operated accelerator pedal which pivots from a bracket and has a fuse box in the general area of the accelerator pedal and also has a rear deck, with a deceleration warning light, using a kit which includes a lamp housing and electric light bulb unit equipped with an amber lens, said housing being adapted for mounting at the rear of the automobile so that the light bulb could, when energized, emit light through the lens to be seen as an amber warning light, said bulb being energized by the application of electric power between electric leads from said housing; a length of insulated cable of sufficient length to run a circuitous path between the area of the accelerator pedal to the area of the lamp housing through the body of the automobile, said cable having means for manual attachment to at least one of the electric leads of said housing; a switch-bracket unit including a bracket for mounting to the pedal bracket and a switch mounted on the switch bracket and having an activator arm, said switch and switch bracket being so arranged that they may be positioned and adjusted near the automobile accelerator pedal so as to have the switch be activated upon release of the driver's foot from the accelerator pedal; said switch having means for receiving an electrical connection from said electrical cable, and said cable including means for connecting said electrical cable to the fuse box of the automobile, said bracket-switch unit comprising a standard member having a base with a bolt receiving opening for fitting under and being secured in place by one of the bolts of said pedal bracket, said standard member having a



standard section projecting at approximately a right angle to said base, a second member attached to the standard section of said standard member in such a manner as to be pivotably displaceable thereon and secured in any one of a range of pivotable positions relative thereto, said switch unit being secured to said second member, including the steps of:

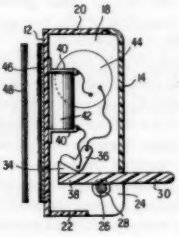
securing with the base of said standard member in one of the bolts of the accelerator bracket so that the pivotal axis between said second member and said standard member is approximately paralleled to the pivotal axis of the accelerator linkage, and

adjusting the pivotal displacement of said second member so that switch arm is contacted and operated by said linkage when in its position corresponding to an undepressed accelerator and is not contacted and is not operated by said linkage when in positions corresponding to a depressed accelerator.

4,686,504
PET OPERABLE ANNUNCIATOR

Richard W. German, 1823 Prelude Dr., Vienna, Va. 22180

Filed Aug. 7, 1986, Ser. No. 894,200
Int. Cl.[4] G08B *3/00*
U.S. Cl. 340—328 6 Claims



1. A pet actuatable annunciator adapted for installation adjacent a door comprising:

a housing having top, bottom, side, front and rear walls, said

front wall being shorter than said rear wall and said bottom wall being shorter than said top wall thereby providing an opening at the lower front of said housing;

a shaft carried by said side walls and extending vertically across the interior of said housing parallel to said front wall thereof, said shaft being located inwardly of and below the upper edge of said opening;

a lever mounted on said shaft for pivotal movement relative to said housing and having a forward end projecting outwardly through said opening and a rear end extending rearwardly of said shaft;

a counterweight carried by said rear end of said lever;

a switch operated by said lever, said switch being open when said lever is in its normal position and closing upon depression of said forward end thereof;

a battery within said housing; and

an electrically operated annunciator mounted on said housing and connected in series with said battery and said switch.

4,686,505

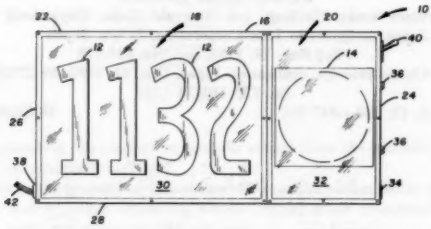
EMERGENCY LIGHTING SYSTEM

Curtis E. Vanderburg, 1132 Mermaid Dr., Annapolis, Md. 21401

Filed Sep. 13, 1984, Ser. No. 649,926

Int. Cl.[4] G08B *5/38*

U.S. Cl. 340—331 **4 Claims**



1. An emergency lighting apparatus, comprising, a rigid housing; an interior wall within said housing dividing said housing into first and second rigid compartments; a first face plate having numbers thereon mounted to said housing in front of said first compartment, said first plate being opaque and integral with the numbers thereof, with said numbers being transparent; a second face plate mounted to said housing in front of said second compartment, said second face plate being transparent; an illuminating means mounted within said first compartment, said illuminating means including a plurality of socket fixtures with light bulbs mounted therein, said plurality of socket fixtures being secured within said first compartment, said plurality of socket fixtures being secured in place by screws and electrically connected in parallel; a strobe means mounted within said second compartment, said strobe light being electrically connected in parallel with said plurality of socket fixture; an electrical connecting means connected to carry power to said flashing means and illuminating means, said housing having an aperture through which said electrical connecting means passes; and a switch means also connected to said electrical connecting means for actuating said flashing means and said illuminating means.

4,686,506

MULTIPLE CONNECTOR INTERFACE

Steven Farago, Mount Kisco, N.Y., assignor to Anico Research, Ltd. Inc., Mount Kisco and Rapitech Systems Inc., Suffern, both of, N.Y., a part interest to each

Continuation-in-part of Ser. No. 484,823, Apr. 13, 1983, Pat. No. 4,603,320. This application Jul. 28, 1986, Ser. No. 891,190

Int. Cl.[4] H03K *13/24*

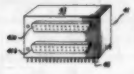
U.S. Cl. 340—347 DD **13 Claims**

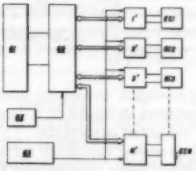
1. A connector for implementing a direct predetermined logical interface between a first data handling system wherein data signals are arranged in a first type of format, and a second data handling system wherein data signals are arranged in a second type of format, comprising:

a connector housing including a first wall part forming a first outside connection surface and a second wall part forming a second outside connection surface;

a first set of terminals arranged to extend at least partly through said first wall part from inside said connector housing in a given configuration for engaging in contact with corresponding terminals of first outside connection means associated with the first data handling system, with said first set of terminals forming an interface member for matingly engaging a corresponding interface member formed by said corresponding terminals associated with the first data handling system;

a second set of terminals arranged to extend at least partly through said second wall part from inside said connector housing in a given configuration for engaging in contact





with multiple corresponding terminals of second outside connection means associated with the second data handling system, with said second set of terminals forming multiple interface members for matingly engaging corresponding interface members formed by said corresponding terminals associated with the second data handling system; and

interface circuit means arranged within said connector housing and coupled between said first set of terminals and said second set of terminals for converting data signals transmitted to at least some of said first set of terminals from the first data handling system in the first type of format into corresponding data signals in the second type of format and providing said corresponding data signals in the second type of format to at least some of said second set of terminals for subsequent transmission to the second data handling system.

4,686,507

INTEGRATED SEMICONDUCTOR CIRCUIT

Heinrich Kessler, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 634,469, Jul. 24, 1984, abandoned. This application Dec. 26, 1985, Ser. No. 815,189

Claims priority, application Fed. Rep. of Germany, Aug. 2, 1983, 3327879

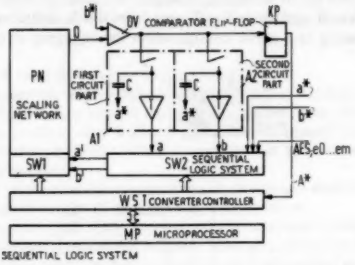
Int. Cl.[4] H03M *1/18*

U.S. Cl. 340—347 AD **10 Claims**

1. An analog signal scaling system for inputting a plurality of analog signals into a microprocessor via an analog-to-digital converter means wherein the analog-to-digital converter means has a plurality of analog inputs, each of which is associated with an external analog input signal to be digitalized, and a control input line being provided between the microprocessor and the analog-to-digital converter for control by the microprocessor and an output line is provided from the analog-to-digital converter to the microprocessor for transferring

digital output signals obtained corresponding to each of the analog input signals to the microprocessor, comprising:

a digital-to-analog converter means wherein an output line is provided from the microprocessor to the digital-to-analog converter means the digital-to-analog converter means selecting appropriate scaling by output to the analog-to-digital converter means of an internal base potential and an internal reference potential so as to define a reference voltage therebetween corresponding to a particular analog signal being input and processed by the analog-to-digital converter means and thus scale the same, the digital-to-analog converter means also having an external base potential input and an external reference potential input so as to define an external reference voltage therebetween;



SEQUENTIAL LOGIC SYSTEM

said analog-to-digital converter means further including a scaling network designed as a capacitance network with digitally weighted capacitors;

said digital-to-analog converter means comprising first and second circuit means each having a digital-to-analog function and wherein the first circuit means sets the internal base potential and the second circuit means sets the internal reference potential; and

first and second sequential logic system means connecting to the analog-to-digital converter means and the digital-to-analog converter means for assisting the analog-to-digital conversion and the digital-to-analog conversion respectively.

4,686,508

ANALOG-TO-DIGITAL CONVERTER CIRCUIT

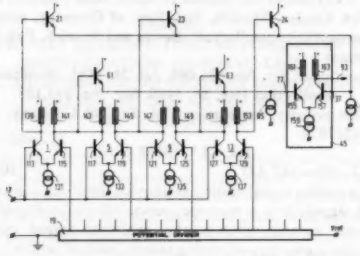
Robert E. J. van de Grift, and Martien van der Veen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1986, Ser. No. 903,046

Claims priority, application Netherlands, Sep. 13, 1985, 8502510

Int. Cl.[4] H03M *1/36*

U.S. Cl. 340—347 AD **1 Claim**



1. An analog-to-digital converter circuit comprising a potential divider having taps each connected to a first input of a respective comparison circuit of a plurality of comparison circuits second inputs of which are interconnected, a same number of taps of the potential divider each time constituting a group, whilst of consecutive groups of taps the branch having the same ordinal number is connected to the first input of a respective comparison circuit of a group of comparison circuits each having a pair of outputs operating in opposite senses with mutual connections between outputs operating in opposite senses of consecutive comparison circuits of said group, characterized in that of each comparison circuit (**15, 9, 13**) of a group only one output (collectors of **115, 119, 125** respectively) is connected to only one output (collectors of **117, 121, 127**, respectively) operating in the opposite sense of the subsequent comparison circuit of the group, whilst the odd outputs (collectors of **113, 119, 121, 129**) of the outputs of a group thus obtained are each connected to the base of a respective transistor of a first group of transistors (**21, 23, 24**) having interconnected emitters which are connected to a first input (**37**) of a differential amplifier (**45**) and the even outputs (collectors of **115, 117, 125, 127**) are each connected to the base of a respective transistor of a second group of transistors (**61, 63**) having interconnected emitters connected to a second input (**77**) of the differential amplifier (**45**).

4,686,509

DIGITAL TO ANALOG CONVERSION METHOD AND SYSTEM WITH THE INTRODUCTION AND LATER REMOVAL OF DITHER

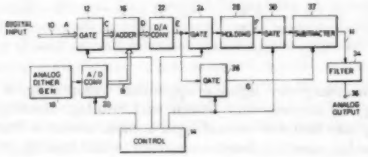
Tetsuro Araki, Hachioji, and Hiroyuki Onda, Hoya, both of Japan, assignors to Teac Corporation, Tokyo, Japan

Filed Dec. 19, 1985, Ser. No. 810,975

Claims priority, application Japan, Dec. 31, 1984, 59-277690

Int. Cl.[4] H03M *1/00*

U.S. Cl. 340—347 DA **10 Claims**



1. A method of faithfully converting a digital data signal such as a digitized audio signal into an analog signal, which comprises:

(a) generating a digital dither signal;

(b) time division multiplexing the digital dither signal and a digital data/dither signal, the latter being formed by adding the digital data signal and the digital dither signal;

(c) converting the multiplexed digital dither signal and digital data/dither signal into an analog dither signal and an analog data/dither signal by means of one and the same digital to analog converter;

(d) holding either of the analog dither signal and the analog data/dither signal for synchronization with the other; and

(e) removing the analog dither signal from the analog data/-dither signal to obtain an analog data signal corresponding to the digital data signal.

4,686,510

METHOD OF AVERAGING A PLURALITY OF MEASURED MODULO VALUES

Alan J. Baker, 10329 33rd Ave. SE., Everett, Wash. 98204

Division of Ser. No. 479,043, Mar. 25, 1983, Pat. No. 4,630,033.

This application Oct. 23, 1986, Ser. No. 922,495

Int. Cl.[4] H03K *13/02*; G01D *5/34*

U.S. Cl. 340—347 P **2 Claims**

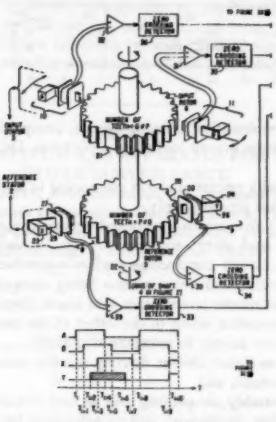
1. A method of averaging a plurality of measured modulo values respectively produced by a corresponding plurality of measuring devices and each corresponding to the same input parameter applied thereto, the method comprising the steps of:

applying a convenient same value of the input parameter to each of the measuring devices;

selecting one of the plurality of measuring devices as a reference;

measuring the offset between the measured modulo values of the measuring device selected as a reference and each of the remaining measuring devices;

applying an arbitrary same value of the input parameter to each of the measuring devices;



measuring the respective modulo values from the plurality of measuring devices;

diminishing each of the measured modulo values from a non-reference measuring device by the offset associated with that measuring device; and

averaging the measured modulo value from the reference measuring device and the diminished measured modulo values.

4,686,511

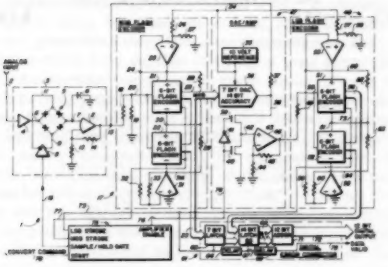
SUBRANGING ANALOG-TO-DIGITAL CONVERTER WITH FET ISOLATION CIRCUIT BETWEEN SUBTRACTION NODE AND LSB ENCODER

Myron J. Koen, Tucson, Ariz., assignor to Burr-Brown Corporation, Tucson, Ariz.

Filed Aug. 23, 1985, Ser. No. 768,947

Int. Cl.[4] H03M *1/14*

U.S. Cl. 340—347 AD **28 Claims**



1. An X-bit subranging analog-to-digital converter, being an integer, said subranging analog-to-digital converter comprising in combination:

(a) means for producing a fist analog signal;

(b) first analog-to-digital converting means for producing a first Y bit binary word representative of the first analog signal, Y being an integer that is less than X;

(c) means for conducting the first analog signal to a summing conductor with essentially no delay, attenuation or amplification;

(d) digital-to-analog converting means responsive to the first Y bit binary word for producing a second analog signal and applying it to the summing conductor, the digital-to-analog converting means having an accuracy of at least X bits, the application of the first analog signal and the second analog signal to the summing conductor producing on the summing conductor a difference signal accurately representative of the X-Y least significant bits of an X bit binary equivalent of the first analog signal;

(e) means for amplifying the difference signal by a predetermined factor to produce an amplified difference signal, the amplifying means including an input;

(f) means for selectively coupling and decoupling the input of the amplifying means to and from the summing conductor to prevent the voltage on the summing conductor from overdriving the amplifying means until the difference signal has stabilized;

(g) second analog-to-digital converting means for producing a first Z-bit binary word representative of the amplified difference signal, Z being an interger less than X; and

(h) means for combining the Y-bit binary word and the Z-bit binary word to produce an X-bit binary word that precisely represents the first analog signal.

4,686,512

INTEGRATED DIGITAL CIRCUIT FOR PROCESSING SPEECH SIGNAL

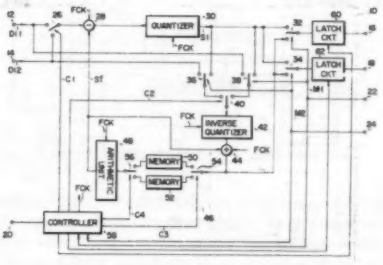
Makoto Nakamura, Kanagawa; Hideo Suzuki, Kawasaki, and Toshihiko Kuroki, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 27, 1986, Ser. No. 833,252

Claims priority, application Japan, Mar. 1, 1985, 60-40507; Sep. 25, 1985, 60-210132

Int. Cl.[4] H03M *7/37*

U.S. Cl. 340—347 DD **6 Claims**



1. An integrated circuit device which is applied to a digital communication system and has input terminals and output terminals, said device comprising:

(a) input signal selector means for receiving digital input signals supplied through the input terminals and for generating selected input signals in a time-division multiplexing manner;

(b) subtractor means for receiving a prediction signal and each of the selected input signals timedivisionally supplied thereto from said signal selector means and for generating a difference signal representing a difference between the prediction signal and each of the selected input signals;

(c) quantizer means for quantizing the difference signal output from said subtractor means to generate a digitally compressed signal including an adaptive differential pulse code modulation signal;

(d) inverse quantizer means for inversequantizing the digi-

tally compressed signal to generate an inverse-quantized signal;

(e) predictor means for generating said prediction signal to be supplied to said subtractor means based on said inverse-quantized signal; and

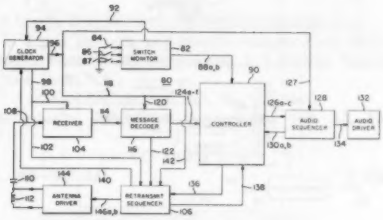
(f) signal path changing means for receiving a mode select signal, for changing an electrical connection among said subtractor means, said quantizer means, said inverse quantizer means and said output terminals in response to the mode select signal in such a manner that, in a first operation mode, said subtractor means, said quantizer means and said inverse quantizer means are electrically connected with each other so as to form an encoder configuration for each of the selected input signals wherein the input signals are encoded to be supplied to the output terminals in a time-division multiplexing manner, said signal path changing means causing, in a second operation mode, said subtractor means and said quantizer means to be electrically disconnected so as to form a decoder configuration for each of the selected input signals wherein the input signals are decoded to be supplied to the output terminals in a time-division multiplexing manner.

4,686,513

ELECTRONIC SURVEILLANCE USING SELF-POWERED ARTICLE ATTACHED TAGS

James G. Farrar, Boca Raton, and Ezra D. Eskandry, Miami, both of Fla., assignors to Sensormatic Electronics Corporation, Deerfield Beach, Fla.

Filed Sep. 30, 1985, Ser. No. 781,537
Int. Cl.[4] G08B *13/18*
U.S. Cl. 340—572 **20 Claims**



1. An electronic surveillance system of type employing alarm tags releasably attachable to articles to be monitored in an installation, said system comprising:

(a) transmitter means for radiating signals containing a plurality of different messages for said tags;

(b) a plurality of alarm tags, each having

(1) attachment means for releasably attaching said tag to an article and providing an output indication of the attachment state thereof;

(2) receiver means for receiving such radiated signals and for decoding the messages contained therein; and

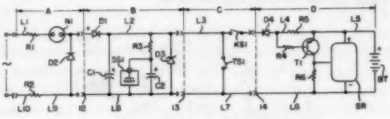
(3) tag controller means connected to said attachment means and to said receiver means for selectively generating an output alarm indication responsive to said attachment means state output indication and such decoded messages.

4,686,514

ALARM SYSTEM FOR COMPUTERS AND THE LIKE

Frank J. Liptak, Jr., Webster, and Arthur J. North, Rochester, both of N.Y., assignors to Integrated Technology Work, Inc., Pittsford, N.Y.

Filed May 22, 1986, Ser. No. 865,626
Int. Cl.[4] G08B *13/14*
U.S. Cl. 340—571 **14 Claims**



1. A motion sensitive warning device, comprising

a first modular circuit including a portable, DC power supply,

an electrically operated alarm connected in said first circuit across said power supply,

electronic valve means interposed between said power supply and said alarm and operative to be switched selectively between conducting and non-conducting modes, respectively, said valve means being operative when in one of its modes to maintain said alarm deenergized, and being operative when in the other of its modes to cause said power supply to energize said alarm,

a second modular circuit having therein motion-sensitive switch means, and

means releasably connecting said second circuit at one side to said first circuit with said switch means being operative to maintain said valve means in said one mode when said second circuit is stationary, thereby to maintain said alarm deenergized, and being operative to switch said valve means to its other mode, thereby to energize said alarm when said second circuit is subjected to physical movement, and

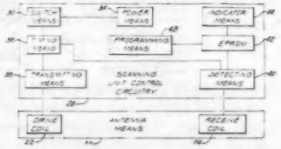
said switch means including means connected across said DC power supply and operative to switch said valve means automatically back to said one mode, when after having been subjected to physical movement said second circuit once again becomes stationary.

4,686,515

APPARATUS AND METHOD FOR MARKER VERIFICATION

Philip M. Anderson, Madison; Richard C. Ujazdowski, Flemington, and Jeffrey C. Urbanski, Sparta, all of N.J., assignors to Allied Corporation, Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 700,256, Feb. 11, 1985. This application Apr. 25, 1985, Ser. No. 727,305
Int. Cl.[4] G08B *13/14*; G07D *7/00*
U.S. Cl. 340—572 **8 Claims**



1. A product verification system, comprising: a verification marker secured to the product that produces an identifiable signal in response to an applied interrogation field, said marker

including an amorphous metal ribbon and said identifiable response signal being vibration frequency; and a matched scanning unit including:

(a) means for establishing said applied interrogation field;

(b) means for detecting and processing said response signal from said marker; and

(c) means for indicating a scanning code having a known relationship with the identifiable response signal of said marker; said scanning code being random to disguise the response signal of the marker and being selected to match and have a known relationship to the response signal frequency of said marker; and

(d) means to allow matching of said response signal to said scanning code for verification of the authenticity of said product.

4,686,516

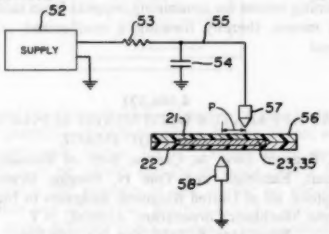
METHOD, SYSTEM AND APPARATUS FOR USE IN ARTICLE SURVEILLANCE

Floyd B. Humphrey, Bradfordwoods, Pa., assignor to Sensormatic Electronics Corporation, Deerfield Beach, Fla.

Continuation-in-part of Ser. No. 675,005, Nov. 26, 1984. This application Aug. 1, 1985, Ser. No. 761,611

Int. Cl.[4] G08B *13/26*

U.S. Cl. 340—572 **21 Claims**



1. A method for deactivating an article surveillance marker having a component responsive, in the absence of deactivation, to incident magnetic energy for causing an associated article surveillance system to render an output alarm, said method including the deactivation step of modifying the molecular organization of at least a portion of said component.

4,686,517

FIELD DISTURBANCE DETECTION SYSTEM

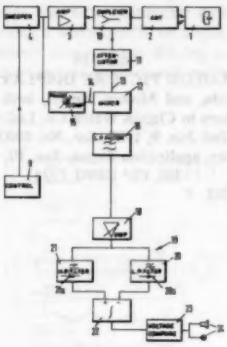
Tallienco W. H. Fockens, GV Eibergen, Netherlands, assignor to N.V. Nederlandsche Apparatenfabriek NEDAP, De Groenlo, Netherlands

Filed May 30, 1984, Ser. No. 615,240

Int. Cl.[4] G08B *13/14*

U.S. Cl. 340—572 **3 Claims**

1. An electromagnetic detection system which, in operation, in a detection zone, by means of at least one transmission antenna coil, generates a swept-frequency interrogation field as a continuous wave field capable of being at least partly disturbed by a responder comprising a tuned circuit, if such responder is present in said detection zone, there being provided a detection means coupled with at least one detection antenna coil for detecting such disturbance, characterized in that said detection means comprises: means for eliminating spurious frequencies located outside the band of the swept frequency, said means for eliminating comprising a mixer including a first input, to which a deteced signal from the detection antenna coil(s) is supplied, and a second input to which an output signal from a sweeper generating said continuous wave field and feeding said transmission antenna coil(s) is supplied, and including an output connected with a low-pass filter, said mixer mixing substantially all of the detected signal with the continuous wave output signal, a discriminator filter means for separating signals from a responder that are passed by said low-pass filter and spurious signals that are passed by said low-pass filter and have a frequency close to the frequency of the responder signals, by means of a second low-pass filter and a high-pass filter parallel-connected with said second low-pass filter, and a first rectifier for rectifying the output signals from the second



low-pass filter, and a second rectifier for rectifying the output signals from the high-pass filter, and that the output signals from the first and second rectifier are respectively supplied to a first and second input of an integrator.

4,686,518

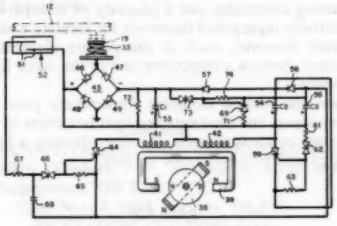
FAULT INDICATOR HAVING TRIP INHIBIT CIRCUIT

Edmund O. Schweitzer, Jr., 2433 Center St., Northbrook, Ill. 60062

Filed Jul. 29, 1983, Ser. No. 518,535

Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—664 **7 Claims**



1. A fault indicator for indicating the occurrence of a fault current of a predetemined threshold level in an electrical conductor of an alternating current power distribution system, wherein the conductor is subject to an inrush current of a predetermined level equal to or greater than the fault current threshold level upon interruption and subsequent restoration of voltage on the conductor, comprising:

status indicating means having a reset-indicating stage and a fault-indicating state;

trip circuit means operatively associated with said status indicating means for conditioning said status indicating means to said fault-indicating state in response to the occurrence of a fault cuurent in the electrical conductor;

said trip circuit means including a trip capacitor, means for developing a charge in said trip capacitor during the presence of voltage on the conductor, and means for utilizing the charge developed in said trip capacitor to condition said status indicating means to said fault-indicating state; and

trip inhibit circuit means operatively associated with said trip circuit means for inhibiting said trip circuit means from responding to currents at said predetermined inrush

current level for a predetermined period of time following interrruption and restoration of voltage on the electrical conductor, whereby said fault indicator is rendered non-responsive to the occurrence of such inrush currents in the conductor.

4,686,519

MULTICOLOR PICTURE DISPLAY DEVICE

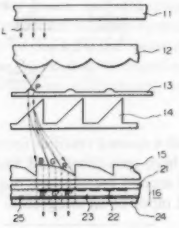
Hirohiko Yoshida, and Minoru Natori, both of Tokorozawa, Japan, assignors to Citizen Watch Co. Ltd., Tokyo, Japan

Filed Jan. 9, 1985, Ser. No. 690,071

Claims priority, application Japan, Jan. 10, 1984, 59-2502

Int. Cl.[4] G09G *3/36*

U.S. Cl. 340—701 **8 Claims**



1. A multicolor picture display device, comprising:

means for emitting collimated white light;

prismatic means for spectroscopically separating the collimated white light into three primary color light components;

a light valve for receiving the separated color light components, the light valve including a plurality of transparent scanning electrodes and a plurality of transparent signal electrodes superposed thereover for forming a plurality of picture elements, each of the picture elements having incident thereon a respective one of the color light components;

wherein the picture elements respectively pass the light components and modulate the light quantities of the components incident thereon, thereby effecting a bright and energy efficient multicolor picture.

4,686,520

DIGITAL COLOR ENCODER

Shigemitsu Yamaoka, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Dec. 4, 1984, Ser. No. 678,163

Claims priority, application Japan, Dec. 6, 1983, 58-231017; Dec. 6, 1983, 58-231018; Jan. 19, 1984, 59-008114

Int. Cl.[4] G09G *1/28*

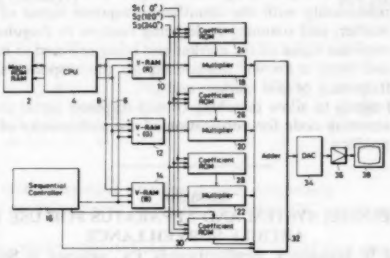
U.S. Cl. 340—703 **7 Claims**

1. A digital color encoder for synthesizing a composite color video signal of a modulated chrominance subcarrier, comprising:

sampling signal generator means for generating a sampling clock signal having a frequency which is n times as high as a frequency of the chrominance subcarrier, where n is an integer greater than two, and for generating n-phase sampling signals respectively staggered in phase by 360/n degrees and having said subcarrier frequency;

sampled primary color signal producing means for producing color image signals which are digital representations of respective primary colors, and are sampled at said frequency of said sampling clock signal;

coefficient providing means for providing, in response to said n-phase sampling signals, predetermined coefficients which are digital representations of the respective staggered phases for the respective primary color image signals, said coefficients being determined as values which appear as coefficients to the respective primary color image signals as expressed in a formula indicative of the composite color video signal at the respective sampling phases;



multiplying means for multiplying said sampled primary color image signals by said respective coefficients at the respective corresponding phases; and

combining means for combining outputs from said multiplying means, thereby forming a synthesized color video signal.

4,686,521

DISPLAY APPARATUS WITH MIXED ALPHANUMERIC AND GRAPHIC IMAGE

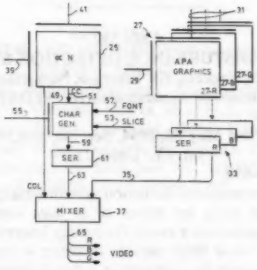
Paul A. Beaven; Dave A. Canton, both of Romsey; Nick B. Sargeant, Eastleigh, and Tom H. Snagge, Bramdean, Nr. Aylresford, all of United Kingdom, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 6, 1985, Ser. No. 708,755

Claims priority, application European Pat. Off., Mar. 7, 1984, 84301497.8

Int. Cl.[4] G09G *1/28*

U.S. Cl. 340—703 **7 Claims**



1. Display apparatus having a raster scanned color cathode ray tube display for displaying alphanumeric and graphical data comprising a refresh buffer containing representations of data to be displayed on said cathode ray tube display and refresh logic arranged to periodically address said refresh buffer to obtain pel-defining-bit information, said refresh buffer including an alphanumeric coded character buffer for storing coded representations of alphanumeric characters or symbols to be displayed on said apparatus device together with character attribute information for determining how said characters are to be displayed, said attribute information including foreground and background color definition a character generator addressable by said coded representations to provide bit patterns corresponding to said characters to be displayed, an all

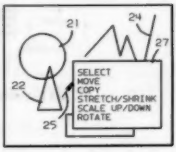
points addressable graphics buffer for containing bits representing a graphic image and a mixer for combining the bit pattern derived from the graphics buffer with the bit pattern derived from the character generator in accordance with at least one control bit in the attribute information associated with each coded representation in said coded alphanumeric character buffer.

4,686,522

METHOD OF EDITING GRAPHIC OBJECTS IN AN INTERACTIVE DRAW GRAPHIC SYSTEM USING IMPLICIT EDITING ACTIONS

Irene H. Hernandez; Carol S. Himelstein, and John S. Wang, all of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 19, 1985, Ser. No. 703,161
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—709 **7 Claims**



1. A method of editing displayed graphic objects in an interactive draw graphic system having (a) a display device with an operator positionable cursor for displaying to an operator graphic objects to be edited, and (b) an input device having means to control the position of said cursor on the display device and first and second two position keys for providing to said system three different control signals, said method comprising the steps of:

(A) displaying to said operator a menu of available graphic editing actions in response to a first said control signal being sent from said input device to said system when said operator presses and releases said first key,

(B) establishing one of said available editing actions as the active editing action including the steps of;

(1) positioning said cursor in a first position relative to said one editing action, and

(2) sending a second said control signal from said input device to said system when said second key is pressed and released by said operator while said cursor is in said first position, and

(C) selecting one of said objects to be edited by said active editing action including the steps of;

(1) positioning said cursor in a second position relative to said one said object, and

(2) sending a third control signal from said input device to said system in response to said operator pressing said second key when said cursor is at said second position and holding said second key pressed until said active editing action on said selected object is completed,

whereby said operator may continue editing the same or another said object with said active editing action by repeating step (C) without the necessity of repeating steps (A) and (B).

4,686,523

CURSOR DISPLAY FOR OSCILLOSCOPES

L. Rodney Bristol, Tigard, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

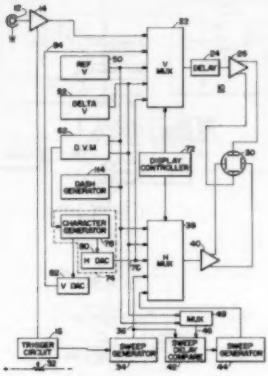
Filed Jan. 31, 1984, Ser. No. 575,417
Int. Cl.[4] G09G *3/02*
U.S. Cl. 340—709 **4 Claims**

1. An apparatus for providing a cursor presentation on a cathode-ray-tube screen in conjunction with waveform information displayed through application of deflection controlling inputs to first and second orthogonally related deflection means of said cathode-ray-tube, said apparatus comprising:

means for providing an adjustable cursor value,

a first multiplexer connected in driving relation to said first deflection means, said first multiplexer receiving a signal input representing a waveform to be displayed,

a second multiplexer connected in driving relation to said second deflection means, said second multiplexer receiving time base information for displaying said waveform, and



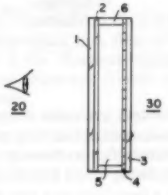
means for supplying said cursor value via one of said multiplexers to its corresponding deflection means and means for simultaneously supplying a stepped input via the other multiplexer to its corresponding deflection means, thereby generating a discontinuous cursor line in viewable relation to said waveform.

4,686,524

PHOTOSENSITIVE ELECTROPHORETIC DISPLAYS

Roger P. White, Yonkers, N.Y., assignor to North American Philips Corporation, New York, N.Y.

Filed Nov. 4, 1985, Ser. No. 795,005
Int. Cl.[4] G02F *1/01*; G09G *3/34*
U.S. Cl. 340—787 **5 Claims**

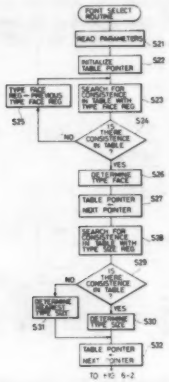


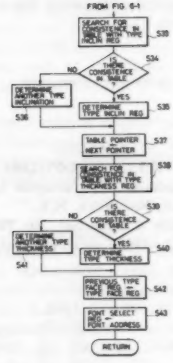
1. A photosensitive electrophoretic display device comprising a first transparent substrate having a transparent electrode thereon, an electrophoretic suspension, and a transparent substrate having a second electrode structure formed in facing relationship to the electrophoretic suspension, wherein the second electrode structure comprises at least two interdigitized electrodes, a photosensitive material, and a plurality of conductors covering at least a portion of each of said at least two electrodes.

4,686,525
IMAGE DATA OUTPUT APPARATUS

Satoshi Nagata, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1984, Ser. No. 657,784
Claims priority, application Japan, Oct. 11, 1983, 58-188351
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—790 15 Claims





1. An image data output apparatus comprising:

font storing means capable of storing plural kinds of fonts each having attribute factors therein;

input means for inputting a font selection command indicating selection of a font from said font storing means; and

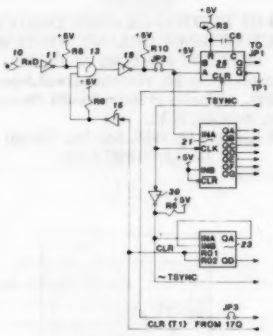
selecting means for selecting a font from said font storing means in accordance with the command inputted from said input means;

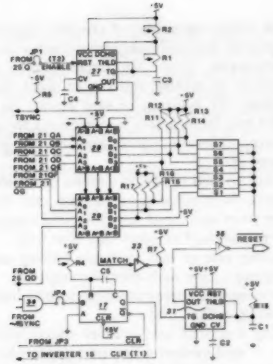
said selecting means performing selection of a font designated by the font selection command when the designated font is stored in said font storing means, and performing selection of another font having the same attribute factors as those of the font designated by the font selection command when the designated font is not stored in said font storing means.

4,686,526
REMOTE RESET CIRCUIT

Russell E. Gritzo, West Melbourne, Fla., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 12, 1985, Ser. No. 775,547
Int. Cl.[4] H04Q *9/00*; G05B *23/02*; H04H *11/00*
U.S. Cl. 340—825.06 2 Claims





1. A remote reset circuit for remotely resetting a digital system, the remote reset circuit accepting a receiver data (RxD) signal and generating a reset signal upon receiving the correct RxD reset signal, the remote resetting circuit comprising in combination:

adjustable one-shot means triggered by the RxD signal for providing a timed pulse output long enough in duration to permit the clocking in of a desired number of bits transmitted at a predetermined baud rate from the source of the RxD signal;

timing means triggered by the timed pulse output of said adjustable one-shot means for providing a synchronous clock signal (Tsync);

counting means triggered by the Tsync clock signal for counting the desired number of bits clocked in from the source of the RxD signal;

means for presetting a desired reset pattern of bits;

means for comparing the bits in the desired number of bits clocked in from the source of the RxD signal with the desired reset pattern of bits and for providing a match signal when the desired number of bits clocked in from the source of the RxD signal compares in pattern with the desired reset pattern of bits; and

means for generating a signal to reset the digital system upon

receipt of the match signal from said means for comparing.

4,686,527

VERIFICATION SYSTEM FOR DOCUMENT SUBSTANCE AND CONTENT

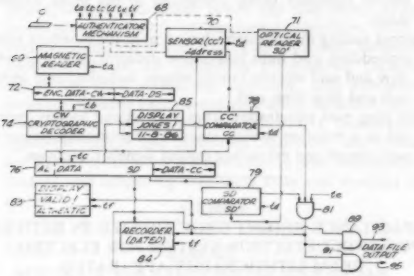
Robert N. Goldman, Honolulu, Hi., assignor to Light Signatures, Inc., Los Angeles, Calif.

Continuation-in-part of Ser. No. 687,708, Dec. 31, 1984, Pat. No. 4,568,936, which is a continuation-in-part of Ser. No. 657,849, Oct. 4, 1984, Pat. No. 4,656,473, which is a continuation-in-part of Ser. No. 503,392, Jun. 10, 1983, Pat. No. 4,476,468, which is a continuation-in-part of Ser. No. 276,282, Jun. 22, 1981, Pat. No. 4,423,415, which is a continuation-in-part of Ser. No. 161,838, Jun. 23, 1980, abandoned. This application Nov. 12, 1985, Ser. No. 797,302

The portion of the term of this patent subsequent to Feb. 4, 2003, has been disclaimed.

Int. Cl.[4] H04Q *9/00*; **G06K** *5/00*

U.S. Cl. 340—825.34 **19 Claims**



1. An apparatus for producing secure, individually distinct, machine-processable documents, comprising:

a document mechanism means for positionally supporting said documents;

anticounterfeit character sensing means for sensing anticounterfeit characteristic data from a document as positioned by said document mechanism means;

means for receiving individual statistical data for said documents;

means for encoding said anticounterfeit data and said statistical data; and

means for recording said anticounterfeit data and said statistical data on a document in encoded form as said document is positioned by said document mechanism means.

4,686,528

METHOD OF ENCODING AND DECODING DATA SIGNALS

Enrique Ferrer, Miami, and Charles M. Schlosser, Coral Springs, both of Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 575,646, Jan. 31, 1984, abandoned. This application Mar. 26, 1986, Ser. No. 843,876

Int. Cl.[4] G08B *5/22*

U.S. Cl. 340—825.44 **1 Claim**

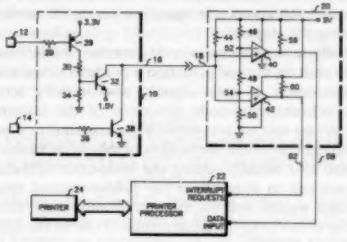
1. In a radiopager code responsive system for interfacing with a peripheral device, a method of encoding a digital signal and decoding the encoded digital signal comprising the steps of:

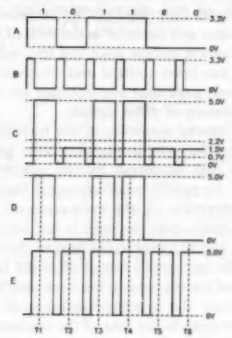
supplying a two level binary digital signal comprised of a series of data bits,

supplying a pulse signal with single pulses corresponding to each of said data bits,

combining the binary digital signal and the pulse signal to produce an encoded signal having a first level corresponding to one level of said two level binary signal, a second level corresponding to the other level of said two level binary signal and a third level immediately preceding each of said first and second level, for each of said data bite;

detecting when the encoded signal is at the third level and providing a decoded data output signal at one level at that time;





detecting when the encoded signal is at one of said first and second levels and providing the decoded data output signal at said one level at that time, and

detecting when the encoded data level signal is at the other of said first and second levels and providing the decoded data output signal at another level at that time, and

providing a pulse output signal with a single pulse occuring during each data bit of the decoded data output signal.

4,686,529

REMOTE-CONTROL LOCK SYSTEM

Frank Kleefeldt, Heiligenhaus, Fed. Rep. of Germany, assignor to Kiekert GmbH & Co. Kommanditgesellschaft, Heiligenhaus and Telefunken Electronic GmbH, Heilbronn, both of, Fed. Rep. of Germany

Filed Jan. 6, 1984, Ser. No. 568,610

The portion of the term of this patent subsequent to Jun. 24, 2003, has been disclaimed.

Int. Cl.[4] G08C *19/00*; **G06F** *7/04*

U.S. Cl. 340—825.69 **7 Claims**

1. A method of operating a remote-control lock system having

a transmitter provided with a main-code generator that can emit any of a set formed of a multiplicity of differently coded main-code signals and with a synchronization-code generator that can emit any of a set formed of a multiplicity of differently coded synchronization signals different from the main code signals,

a receiver provided with a main-code decoder that can be set to respond to any of the signals and with a synchroniza-

tion-code decoder that can be set to respond to any of the synchronization signals,

control means for resetting the main-code decoder of the receiver to a predetermined one of the main-code signals on receiving by the synchronization-code decoder of the synchronization signal it is set to, and

a lock operable by the receiver when its main-code decoder receives the main-code signal it is set to, the method comprising the steps of:

initially setting the main-code generator of the transmitter to emit on normal actuation a predetermined one of the succession of main signals, also initially setting the synchronization-code generator of the transmitter to emit on special actuation of the transmitter a predetermined one of the succession of synchronization signals, and also initially setting the main-code decoder of the receiver to respond to the predetermined one of the main signals and the synchronization-code decoder of the receiver to the predetermined one of the synchronization signals;

thereafter on normal actuation of the transmitter, after each emission by the main-code generator of the transmitter and reception by the main-code decoder of the receiver of the main signal they are both set to, resetting the main-code generator and decoder to the next of the main signals in the succession except after the last main signal of the succession has been emitted and received in which case the main-code generator and decoder are reset to the first of the succession of main signals;

thereafter on special actuation of the transmitter, after each emission by the synchronization-code generator of the transmitter and reception by the synchronization-code decoder of the synchronization signal they are both set to and after reception by the main-code decoder of the receiver of a main-code decoder is not set to, resetting the transmitter and receiver to the next of the synchronization signals in the succession except after the last synchronization signal of the succession has been emitted and received in which case the synchronization-code generator and decoder are reset to the first of the succession of synchronization signals; and

resetting the main-code generator to the predetermined one of the main signals on emission of a synchronization signal.

4,686,530

CABLE TRANSMISSION OF SIGNALS

Arthur Schneider, Braunschweig; Walter Baum, and Hermann Zehl, both of Hanover, all of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

Filed Aug. 17, 1982, Ser. No. 408,822

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1981, 3128498

Int. Cl.[4] G08C *19/06, 19/02;* **G08B** *21/00*

U.S. Cl. 340—870.31 **8 Claims**

1. A remotely effective pick up and transducing system for use in automobiles and being responsive to physical motion adjacent to a particular point and location comprising:

magnetic means provided for converting said motion into a variable, magnetic field at said point and location;

a magnetic field responsive pulse generator disposed at that location in order to be responsive to said variable magnetic field;

an electro-optical transmitter connected to the generator and having a light producing output;

sealing means for moisture proof embedding said pulse generator and said transmitter element and having a wall portion being sufficiently thin for permitting the magnetic field to penetrate the wall portion so as to be responded to by said pulse generator;

a light conductor having two ends respectively establishing entrance and exit windows, the light conductor at its entrance window end terminating inside said sealing means so that said entrance window is likewise embedded in a moisture sealing manner in said sealing means and in a position adjacent to said transmitter;

a light responsive detector disposed adjacent said exit window;

electric circuit means including an amplifier and a pulse forming stage connected to the amplifier, and electrically connected to the detector and establishing an electrical circuit, the circuit having power supply input and signal output terminals and plug pins connected thereto, the output terminals being connected to the pulse forming stage;

second sealing means establishing a plug for moisture proof embedding said light responsive detector, said exit window and said electric circuit means, including said terminals and plug pins; and

said plug pins penetrating from said second sealing means but in a moisture sealing manner for providing power to said circuit and extracting output signals therefrom.

4,686,531

CAPACITANCE HEIGHT GAGE APPLIED IN RETICLE POSITION DETECTION SYSTEM FOR ELECTRON BEAM LITHOGRAPHY APPARATUS

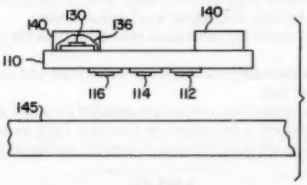
John R. Shambroom, Lexington, and Alan P. Sliski, Lincoln, both of Mass., assignors to Control Data Corporation, Minneapolis, Minn.

Division of Ser. No. 546,760, Oct. 28, 1983, Pat. No. 4,538,069.

This application Mar. 29, 1985, Ser. No. 717,426

Int. Cl.[4] G08C *19/10*

U.S. Cl. 340—870.37 **12 Claims**



1. A capacitance height gage for detecting the position of an object surface, comprised of:

a hybrid substrate supported proximately to said object surface;

a reference capacitor circuit supported on said substrate, said circuit including a reference capacitor having capacitor plates separated by a nominal distance, said reference capacitor having a capacitance, said reference capacitance circuitry generating a reference capacitance signal representative of said capacitance of said reference capacitor;

a signal source circuit providing a driving signal; said driving signal being controlled by said reference capacitor signal;

said reference capacitor circuit being driven by said driving signal;

a measuring capacitor circuit supported on said substrate, said measuring capacitor circuit including a sensor plate supported on said substrate opposite to said object surface, said sensor plate and said object surface comprising a

measuring capacitor whereby the capacitance of said measuring capacitor varies as the separation between said sensor plate and said object surface varies, said measuring capacitor circuitry generating a measuring capacitor signal representative of said capacitance of said measuring capacitor, said measuring capacitor circuit being driven by said driving signal;

means for comparing said measuring capacitor signal with a reference signal, including means for generating a measurement signal representative of said comparison, said measurement signal representing the deviation in plate separation of said sensor plate and said object surface of said measuring capacitor from said nominal distance;

said reference caacitor plates and said measuring capacitor sensor plate and said object surface being separated by a dielectric, said dielectric being comprised of the measuring environment in which said hybrid substrate is located whereby said dielectric of said reference capacitor changes in the same respects as said dielectric of said measuring capacitor as said measuring environment varies; and

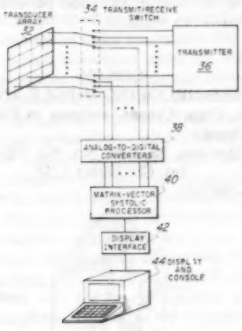
a plurality of sensor plates driven by said driving signal and disposed on the bottom of said substrate opposite to said object surface said sensor plates and said object surface comprising a plurality of measuring capacitors, each of said measuring capacitors having an associated measuring capacitor circuit for generating a measuring capacitor signal for each measuring capacitor, said comparing means comparing each of said measuring capacitor signals with said reference signal to generate a measurement signal for each of said measuring capacitors, said measuring signal representing the deviation in plate separation of each of said measuring capacitors from said nominal distance.

4,686,532

ACCURATE LOCATION SONAR AND RADAR

Alastair D. McAulay, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed May 31, 1985, Ser. No. 739,932
Int. Cl.[4] G01S 7/44
U.S. Cl. 342—195 **11 Claims**



1. In a radar or sonar system a method of estimation of sources of stationary random processes with an array of detectors (labelled with i from 1 to I), comprising the steps of:

(a) subdividing the region containing said sources into annular segments from the center of said array and further subdividing each of said annular segments into volume elements (labelled p from 1 to P) of diameter less than the resolution of said array so the sources within each element may be represented by a single source;

(b) forming an I by P matrix C(w) with the i,p element equal to Qipexp[jwSip] where Qip is the attenuation between the pth source and the ith array detector and Sip is the propagation delay between the pth source and the ith array detector;

(c) computing a P by I matrix D(w) equal to [C(w)*C(w)]~C(w)* with * denoting the transpose and ~ denoting the inverse of a matrix;

(d) time sampling the energy received from said sources by each of said array detectors and Fourier transforming said samples to form an I component vector Z(w); and

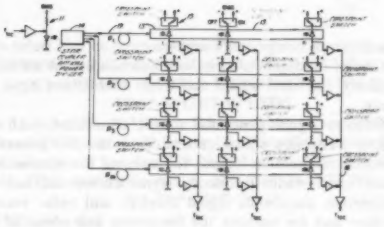
(e) matrix multiplying D(w)Z(w) to yield a P component vector Y(w) which are the power spectrum estimates for the P sources.

4,686,533

OPTOELECTRONICALLY SWITCHED PHASE SHIFTER FOR RADAR AND SATELLITE PHASED ARRAY ANTENNAS

Robert I. MacDonald; Elmer H. Hara, and Arthur L. Poirier, all of Ottawa, Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Ottawa, Canada

Filed Aug. 19, 1983, Ser. No. 524,780
Claims priority, application Canada, Jan. 31, 1983, 420580
Int. Cl.[4] H01Q 3/22
U.S. Cl. 342—373 **12 Claims**



1. Apparatus for supplying phase-shifted electrical signals to a plurality of radiating elements of an array antenna, comprising:

an optical modulator responsive to an input electrical signal to provide an intensity modulated optical signal;

optical phase shift means for receiving said modulated optical signal, and for providing a plurality of discrete, phase-shifted, signals on a plurality of outputs, each said output providing a respective one of said discrete, phase-shifted, signals; and

a switching matrix having columns each adapted to be electrically connected to a respective one of said radiating elements, and rows each optically coupled to one of said phase shift means outputs, a plurality of opto-electric switches located at the intersections of the rows and columns, each switch adapted to provide to the associated column a phase-shifted electrical signal corresponding to the phase-shifted signal received on the associated row, whereby the plurality of radiating elements are selectively energized by the plurality of phase-shifted electrical signals provided from said columns.

4,686,534

RETRO DIRECTIVE RADAR AND TARGET SIMULATOR BEACON APPARATUS AND METHOD

Frederick N. Eddy, Weston, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 2, 1984, Ser. No. 576,498
Int. Cl.[4] G01S 7/40
U.S. Cl. 342—165 **19 Claims**

1. Radar apparatus comprising the combination of:

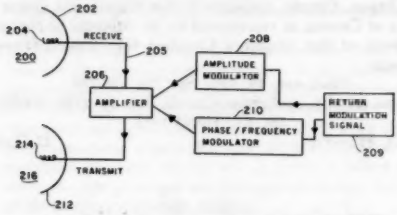
pulse compression radar transmitter and receiver means

including low velocity target suppression threshold apparatus for emitting and receiving radio frequency radar signals having predetermined variations of carrier phase and frequency;

beacon antenna means remotely fixed in position from said transmitter and receiver means for receiving pulse compression radio frequency signals therefrom, said antenna means including a radio frequency electrical signal conveying port;

retroradiating means fixed in position from said transmitter for transmitting to said radar transmitter and receiver means a return radio frequency signal related to said antenna means radio frequency electrical signal;

radio frequency signal generator means connected with said retroradiating means for generating said related radio frequency electrical signal including time varying amplitude modulation and time varying frequency and phase



modulation components supplemental to said pulse compression modulation from said antenna means radio frequency electrical signal and from modulation input signals;

modulation signal generator means connected with said radio frequency signal generator means and generating beacon modulation signals for varying the amplitude of said return radio frequency signal above and below a minimum discernible signal level in said radar receiver means and for varying the frequency and phase of said return radio frequency signal to velocity representations above and below said target suppression threshold;

whereby the modulated signal received by said receiver means from said retroradiating means enables transmitter power output, receiver sensitivity, and target velocity threshold verifications of said pulse compression radar transmitter and receiver means.

4,686,535

MICROSTRIP ANTENNA SYSTEM WITH FIXED BEAM STEERING FOR ROTATING PROJECTILE RADAR SYSTEM

Farzin Lalezari, Boulder, Colo., assignor to Ball Corporation, Muncie, Ind.

Filed Sep. 5, 1984, Ser. No. 647,450
Int. Cl.[4] H01Q *1/38*
U.S. Cl. 343—700 MS **35 Claims**

1. A microstrip antenna system comprising:

an electrically conductive reference surface;

a sheet of dielectric substrate disposed over said reference surface, said dielectric substrate having a thickness of less than one-tenth wavelength at the intended antenna opeating frequency;

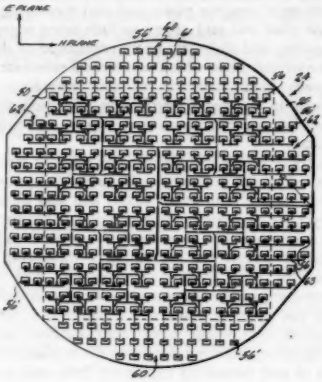
a composite two-dimensional array of integrally formed conductive microstrip radiator patches and feedlines disposed over and supported by said dielectric substrate, said composite two-dimensional array including:

(a) a central two-dimensional array of at least 64 dual slot radiator patches having a resonant E-plane direction dimension of substantially one-half wavelength (in the dielectric) at the intended antenna operating frequency, each such patch thereby defining dual radiations slots between the transverse H-plane direction edges of the patch and the underlying conductive reference surface;

(b) a common r.f. signal input/output connection point offset to one side of said central array;

(c) a corporate-structured array of interconnected microstrip feedlines connecting said input/output connection point to each of said patches and incorporating a fixed-angle phasing offset within the corporate feedline structure for the overall central array thereby steering off-center the main beam of the overall radiation pattern of the antenna system; and

(d) auxiliary linear arrays of dual slot auxiliary radiator patches extending outwardly from the periphery of said



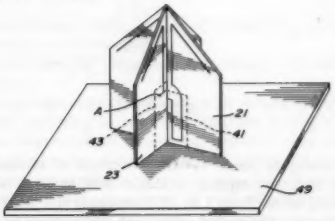
central array with the auxiliary patches having a half-wavelength resonant E-plane dimension aligned with those of the central array and each auxiliary array including an auxiliary tapered amplitude microstrip feedline connected to said corporate-structured array of feedlines and also connected to the auxiliary patches within its respective auxiliary linear array to reduce the r.f. signal amplitude fed to/from each auxiliary patch as its distance from the central array increases whereby the amplitude of side lobes and the main lobe beamwidth in the overall radiation pattern of the antenna system are both reduced.

4,686,536

CROSSED-DROOPING DIPOLE ANTENNA

David Allcock, Carp, Canada, assignor to Canadian Marconi Company, Canada

Filed Aug. 15, 1985, Ser. No. 765,834
Int. Cl.[4] H01Q *1/38*
U.S. Cl. 343—700 MS **6 Claims**



1. A microstrip crossed-drooping dipole antenna arrangement, comprising:

a first planar printed circuit board and a second planar printed circuit board, said boards being assembled to intersect each other at right anles to each other;

each said board comprising a microstrip realization of a drooping dipole antenna;

said realization comprising, for each planar board and on

one side of said board, a first vertical feed line and a second side-by-side vertical feed line; a first radiating element extending from said first feed line on the side of said first feed line opposite said second feed line and a second radiating element extending from said second feed line on the side of said second feed line opposite said first feed line;

a ground plane on each said board comprising a conductive pattern formed on the other side of said board; and

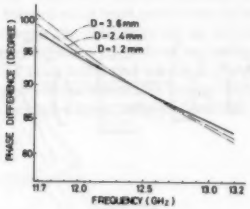
means for feeding said feed lines of said first and second boards such that they have a nominal 90° phase relationship with each other.

4,686,537

PRIMARY RADIATOR FOR CIRCULARLY POLARIZED WAVE

Kazutaka Hidaka, Yokohama, and Hisashi Sawada, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 31, 1985, Ser. No. 815,041
Claims priority, application Japan, Jan. 9, 1985, 60-000809
Int. Cl.[4] G01S *1/08*; H04B *7/19*
U.S. Cl. 343—786 **8 Claims**



1. A circularly polarized wave primary radiator for converting a linearly polarized wave to a circularly polarized wave, comprising:

(a) a horn antenna which is constructed to widen gradually from the feeding edge toward the aperture end; and

(b) conductor projections mounted along the inner wall of said horn antenna in order to convert the linearly polarized wave which is incident upon the feeding end to a circularly polarized wave within said horn antenna,

wherein said conductor projections are shaped to have edge sections on the aperture end side of said horn antenna that slope down along the inner wall of said horn antenna, and said conductor projections are provided facing one of the mutually orthogonal electric field components E_1 and E_2 of the electric field E which is incident upon the feeding end of said horn antenna, and the thickness and the length of these conductor projections are set so as to have the phase difference between the orthogonal electric fields E_1 and E_2 that have the same phase at the feeding end of said horn antenna, will fall at the aperture end within the tolerated range that has 90° as the standard.

4,686,538

TONE RECORDING METHOD

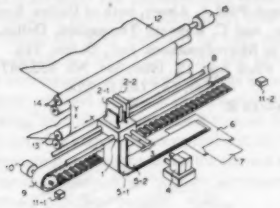
Yasuo Kouzato, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1985, Ser. No. 790,209
Claims priority, application Japan, Oct. 31, 1984, 59-229779; Oct. 31, 1984, 59-229780
Int. Cl.[4] G01D *15/18*; H04N *1/46*
U.S. Cl. 346—1.1 **13 Claims**

1. A tone recording method for recording an image by forming dots in unit areas on a recording medium, the method comprising the steps of:

providing at least two kinds of dots respectively having different concentrations for the same color; and

controlling the optical density of each unit area of the image



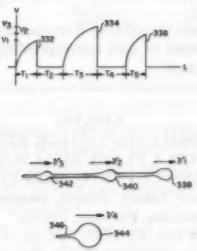
by selecting the number of dots of each concentration to be formed in each unit area and selectively overlapping dots of different concentrations in accordance with input density information.

4,686,539

MULTIPULSING METHOD FOR OPERATING AN INK JET APPARATUS FOR PRINTING AT HIGH TRANSPORT SPEEDS

Lisa M. Schmidle, 39 Hillside Rd., Southbury, Conn. 06488, and Stuart D. Howkins, 29 Farrar La., Ridgefield, Conn. 06877

Continuation of Ser. No. 710,296, Mar. 11, 1985, abandoned. This application Jun. 6, 1986, Ser. No. 873,263
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—1.1 **9 Claims**



1. A method for driving an ink jet head to eject ink droplets which combine to produce drops of ink on a print medium, said method comprising the steps of:

producing and applying to said head a composite drive waveform having, for each drop, at least first, second and third electrical pulses with waveshapes, pulse widths, amplitudes and dead times therebetween for ejecting from said ink jet head respective first, second and third ink droplets having successively higher velocities upon exit from said head; and

selecting said first pulse to have both a pulse width and pulse amplitude each less than the respective pulse width and pulse amplitude of said second pulse whereby said droplets merge in flight for producing an ultimate ink drop having a predetermined velocity V, thereby permitting printing at velocities in excess of 4.0 meters per second, with ink jet head transport speeds up to and exceeding 50 inches per second.

4,686,540

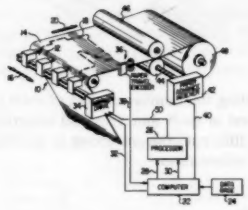
COMPACT PLOTTER FOR GENERATION OF ACCURATE PLOTTED IMAGES OF LONG LENGTH

Elmer N. Leslie; Stephen S. Treadwell, III, both of Dallas; Thomas J. DiFloria, Allen; Larry D. Propst, Rowlett; Richard T. Kushmaul; Paul A. Abney, both of Dallas; Kenneth Stevenson, Plano, and C. Kenneth Thomaston, Dallas, all of Tex., assignors to Microdynamics, Inc., Dallas, Tex.

Filed Apr. 15, 1986, Ser. No. 852,987

Int. Cl.[4] G01D *9/00*

U.S. Cl. 346—33 R **55 Claims**



1. A plotter for printing information on sheet material to reproduce a pattern, comprising:

a sheet carrier for moving the sheet material in a first direction;

marking means for depositing information on the sheet material, said marking means being located adjacent the sheet material and movable in a second direction transverse to said first direction to thereby scan across the sheet material;

means for causing said carrier to incrementally move the sheet material in said first direction;

means for measuring the incremental movement of the sheet material;

a processor connected to said carrier and to said marking means, and including data storage means for storing data corresponding to a pattern to be reproduced on the sheet material; and

allocation means for utilizing from said data storage means a variable amount of data corresponding to the amount of paper movement.

4,686,541

HIGH RESOLUTION IMAGE RESTITUTION APPARATUS FOR A PLANE FILM SUPPLIED FROM A COIL AND CUT INTO FILM-PORTIONS

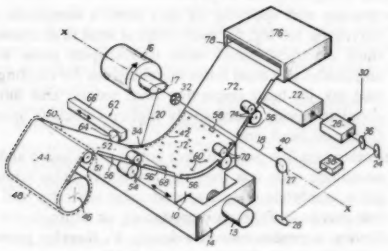
Jean-Claude Rosier, Gasny, France, assignor to Societe Europeenne de Propulsion, Puteaux, France

Filed Sep. 20, 1985, Ser. No. 778,142

Claims priority, application France, Sep. 28, 1984, 84 15007

Int. Cl.[4] G01D *9/00, 9/42;* **G03G** *15/00;* **G03B** *29/00*

U.S. Cl. 346—108 **18 Claims**



1. An apparatus for the restitution of high-resolution images comprising a film-holder adpated to receive a flat film coated with a photosensitive material, a light source producing a light beam, a modulator on the path of the light beam and a device for scanning said film in successive lines by means of said beam, and

further comprising removable means adapted to receive a reel delivering continuously wound film, first means for driving the film out of the reel along a film supply plane, means for applying a portion of film on the film-holder, means for transversely cutting the film after the film is applied to the film holder and prior to exposure of the film, second means for driving the film after exposure from the film-holder along an evacuation plane, and removable means for receiving the portions of exposed, cut out film evacuated from the film-holder.

4,686,542

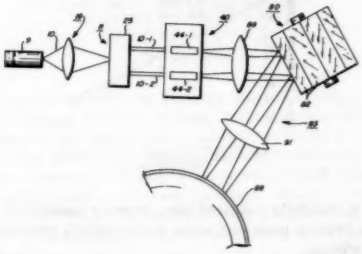
HIGH SPEED, HIGH RESOLUTION RASTER OUTPUT SCANNER

Kwok-Leung Yip, Webster, N.Y.; Ronald L. Antos, Cincinnati, Ohio, and Robert P. Herloski, Rochester, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 3, 1986, Ser. No. 848,003

Int. Cl.[4] G01D *9/42;* **H04N** *1/21*

U.S. Cl. 346—108 **8 Claims**



1. A raster output scanner capable of high speed, high resolution writing of images in response to image signals on a recording member, comprising in combination:

(a) a source beam;

(b) means for separating said source beam into at least two parallel beams;

(c) an acousto-optical light intensity modulator for modulating each of said beams separately, said modulator including an acousto-optic medium sized to provide a separate modulating channel for each of said beams without intruding into adjoining modulator channels, said separating means separating said beams by an amount such that each beam impinges on a separate modulating channel, a separately controllable ultrasonic transducer for each of said beams disposed in operative relation with each of said modulating channels for generating acoustic waves in each of said modulating channels, and control circuit means for intensity modulating the acoustic waves output by each of said transducers in accordance with separate lines of image signals;

(d) means for simultaneously projecting said beams through said modulating channels in a direction transverse to the direction of propagation of said acoustic waves to produce separate moving images of information corresponding to each of said image signal lines;

(e) optical means for simultaneously projecting and scanning said intensity modulated beams onto said recording member at spaced points in a manner such that the velocity of said moving images are substantially equal to and in the opposite direction as the beams are scanned; and

(f) pulse polarity reverse logic circuit means for reversing

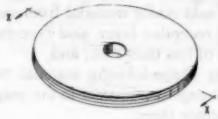
the voltage polarity of alternate bits in each of said image signals in each of said lines to thereby increase the image contrast of the intensity-modulated beams at said recording member.

4,686,543

INFORMATION RECORDING MEDIUM

Yoshio Tani; Masao Yabe, and Kyoichi Naruo, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 10, 1985, Ser. No. 807,091
Claims priority, application Japan, Dec. 12, 1984, 59-260944
Int. Cl.[4] G01D *15/34*
U.S. Cl. 346—137 **6 Claims**



1. An optical information recording medium comprising two disc substrates, which are adhered directly or through a convex portion formed on at least one of the substrates or a spacer provided between the substrates by an adhesive layer, and a recording layer which is capable of recording and/or reading information by laser beam and which is provided on a surface of at least one of the substrates facing the other substrate, wherein the adhesive layer satisfies formulae (1), (2), and (3)

$$d/G \geqq 0.5 \quad (1)$$

$$5 \times 10^2 \geqq G \geqq 5 \quad (2)$$

$$200 \geqq d \geqq 20 \quad (3)$$

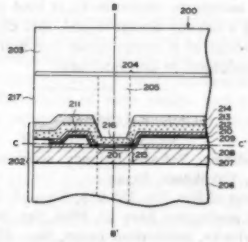
wherein G is the coefficient of shearing elasticity (kg/cm^2) of the adhesive layer at 23° C., and d is the thickness (μm) of the adhesive layer.

4,686,544

LIQUID JET RECORDING HEAD

Masami Ikeda, Machida; Makoto Shibata; Hiroto Takahashi, both of Hiratsuka, and Hiroto Matsuda, Ebina, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 26, 1984, Ser. No. 674,659
Claims priority, application Japan, Nov. 30, 1983, 58-224264
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—140 R **12 Claims**



1. A liquid jet recording head comprising:

a supporting member;

a first electrode layer disposed on said supporting member and having openings therein corresponding to respective liquid flow paths of the recording head;

an insulating layer disposed on said first electrode layer and having openings therein corresponding to said openings in said first electrode layer;

a resistive heater layer disposed on said insulating layer, and on said supporting member through said openings in said first electrode layer and said insulating layer, to provide a heat generating portion for each liquid flow path; and

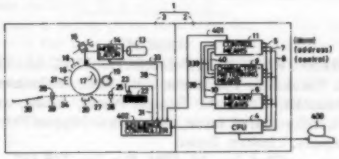
a second electrode layer disposed on said resistive heater layer in electrical contact therewith and having openings therein corresponding to said openings in said first electrode layer and said insulating layer, said second electrode layer being electricaily connected to said first electrode layer to provide respective electrical circuits through said heat generating potions for actuation thereof selectively to eject liquid droplets from orifices corresponding to the respective liquid flow paths.

4,686,545

LASER RECORDING APPARATUS

Shigeki Kimura, Osaka, Japan, assignor to Mita Industries, Co., Ltd., Japan

Continuation of Ser. No. 542,449, Oct. 17, 1983, abandoned.
This application Apr. 4, 1986, Ser. No. 848,338
Claims priority, application Japan, Oct. 18, 1982, 57-182572
Int. Cl.[4] G01D *15/14*
U.S. Cl. 346—160 **9 Claims**



1. A laser recording apparatus for printing rows of characters and inter-row lines between said rows of said characters, said apparatus including an image control circuit for driving a printer mechanism to print said characters and said inter-row lines, and said image control circuit comprising:

memory means for storing character data representing said characters to be printed;

character-patterning means coupled to said memory means for converting said stored character data into character pattern signals, said character-patterning means also including memory regions containing character pattern data used in said conversion;

control means coupled to said character-patterning means for causing said character-patterning means to perform said conversion and for outputting signals to said printer mechanism to cause the printing of said rows of characters and of said inter-row lines, said control means including:

(i) means for reading said character pattern signals from selected portions of said character-patterning memory regions,

(ii) means for causing said reading means to repeatedly read portions of said character pattern signals to form inter-row line signals, and

(iii) means for transmitting said character pattern signals and said inter-row line signals to said printing mechanisms; and

a central processing unit for controlling said memory means, said character-patterning means, and said control means.

4,686,546

HEAT-SENSITIVE RECORDING PAPER

Kazuyuki Koike; Shigehisa Tamagawa, and Tetsuro Fuchizawa, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 9, 1985, Ser. No. 807,135

Claims priority, application Japan, Dec. 11, 1984, 59-261406; Dec. 28, 1984, 59-277779; Apr. 15, 1985, 60-80022

Int. Cl.[4] B41M *5/18*

U.S. Cl. 503—200 **24 Claims**

1. A heat-sensitive recording paper comprising a support having provided thereon a heat-sensitive recording layer, wherein an intermediate layer comprising at least one inorganic pigment having an oil absorption property (JIS K-5101) of at least 30 ml/100 g and less than 50 ml/100 g is interposed between the support and the heat-sensitive recording layer.

4,686,547

HEAT-SENSITIVE RECORDING MATERIAL

Takayuki Hayashi; Toshimasa Usami, and Toshiharu Tanaka, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 6, 1986, Ser. No. 871,350

Claims priority, application Japan, Jun. 6, 1985, 60-123166

Int. Cl.[4] B41M *5/18*

U.S. Cl. 503—207 **15 Claims**

1. A heat-sensitive recording material comprising a support having provided thereon a heat-sensitive recording layer, said heat-sensitive recording layer containing a diazo compound encapsulated in microcapsules and a component capable of undergoing a color forming reaction with said diazo compound, wherein a protective coating layer containing as a binder a modified polyvinyl alcohol containing silicon atoms, and at least one of colloidal silica and amorphous silica is applied on the surface of said heat-sensitive recording layer.

4,686,548

PRESSURE-SENSITIVE RECORDING MATERIAL

Naoya Takahashi, Yokohama; Keiji Endo, Yokosukashi; Eiichi Matsuzaka, Kawasaki; Satoshi Narui, Ayase, and Atsushi Sato, Tokyo, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Japan

Filed Jun. 14, 1985, Ser. No. 745,317

Claims priority, application Japan, Jun. 21, 1984, 59-128168

Int. Cl.[4] B41M *5/16, 5/22*

U.S. Cl. 503—213 **6 Claims**

1. In a pressure-sensitive material prepared by using an electron donating dye-precursor which produces a color when said dye-precursor is brought into contact with an electron accepting color developer, the pressure-sensitive recording material being characterized in that the solvent for said dye-precursor comprises an alkylated fraction which is prepared by alkylating a by-product fraction with at least one alkyl group having 1 to 5 carbon atoms, said by-product fraction containing the components within the boiling range of 255° to 200° on the atmospheric pressure basis and being obtained in the process for producing ethylbenzene or ethyltoluene from ethylene and benzene or toluene, said by-product fraction containing diphenylalkanes and/or phenyltolylalkanes.

4,686,549

RECEPTOR SHEET FOR THERMAL MASS TRANSFER PRINTING

Donald J. Williams, and Marvin R. Kammin, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

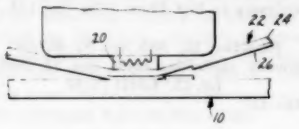
Filed Dec. 16, 1985, Ser. No. 809,494

Int. Cl.[4] B41M *5/26*

U.S. Cl. 503—227 **15 Claims**

12. A method of forming an image on a receptor sheet comprising the steps of:

a. providing a receptor sheet comprising a transparent backing having on at least one major surface thereof a transparent image receptive layer comprising a wax-compatible material having a softening temperature of about 30° C. to about 90° C., and a critical surface tenison exceeding that of donor material of a donor sheet, said image receptive layer sufficiently anchored to said backing to allow the image receptive layer to remain on the backing upon



transfer of said donor material from said donor sheet to said image receptive layer, said receptor sheet having a haze value of less than 15%, and

b. transferring image-forming material borne on a donor sheet in an imagewise manner to the image receptive layer of said receptor sheet.

4,686,550

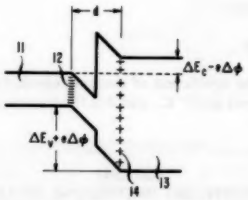
HETEROJUNCTION SEMICONDUCTOR DEVICES HAVING A DOPING INTERFACE DIPOLE

Federico Capasso, Westfield, and Alfred Y. Cho, Summit, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 4, 1984, Ser. No. 677,795

Int. Cl.[4] H01L *29/161*

U.S. Cl. 357—16 **29 Claims**



1. A heterojunction device comprising at least a first region of a first semiconductor material and at least a second region of a second semiconductor material, said first and said second regions having a first heterojunction interface, and a first interface dipole, said dipole comprising a first charge sheet and a second charge sheet, said first and second charge sheets being spatially separated from each other and comprising ionized donors and acceptors, respectively, at least one of said charge sheets being a heavily doped region, said charge sheets being within the lesser of a carrier mean free path or a thermal de Broglie wavelength of said interface.

4,686,551

MOS TRANSISTOR

Teruyoshi Mihara, Yokosuka, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 555,050, Nov. 25, 1983, abandoned. This application May 22, 1986, Ser. No. 865,598

Claims priority, application Japan, Nov. 27, 1982, 57-208293

Int. Cl.[4] H01L *29/78, 29/90*

U.S. Cl. 357—23.4 **17 Claims**

1. A vertical MOS transistor comprising:

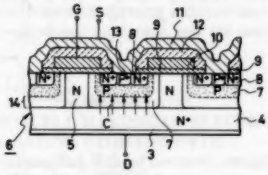
a low specific resistance drain region of a first conductivity type provided with a drain electrode on a lower surface thereof,

a high specific resistance drain region of said first conductiv-

ity type located on an upper surface of said low specific resistance drain region,

a diffused well region of a second conductivity type having a lower surface in contact with said upper surface of said low resistivity drain region to form a junction, said well region having a lower impurity concentration than said low resistivity drain region;

a source region of said first conductivity type partially surrounded by said well region and provided with a source electrode,



means for directly electrically connecting said well region to the source electrode; and

a gate electrode formed above the surface of said well region on an insulating layer;

so that a wide zener diode is formed along said junction between said lower surface of said well region and said upper surface of said low specific resistance drain region and a breakdown voltage applied across said source and drain electrode causes a uniform flow of breakdown current across said junction.

4,686,552

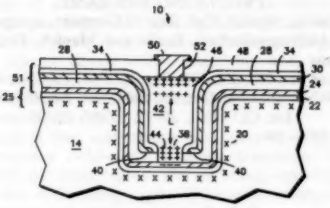
INTEGRATED CIRCUIT TRENCH CELL

Ker-Wen Teng; Bich-Yen Nguyen, and Louis C. Parrillo, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 20, 1986, Ser. No. 864,921

Int. Cl.[4] H01L *29/78, 29/06*

U.S. Cl. 357—23.6 **13 Claims**



1. An integrated circuit formed in a substrate, comprising a trench having walls and a top portion and a bottom portion, a trench capacitor comprising two plates, the capacitor formed on the walls of the trench leaving a narrowed trench within the trench after the formation of both plates, and a transistor formed within the narrowed trench within the capacitor and isolated therefrom.

4,686,553

LOW CAPACITANCE AMORPHOUS SILICON FIELD EFFECT TRANSISTOR STRUCTURE

George E. Possin, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Aug. 2, 1985, Ser. No. 761,921

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.7 **7 Claims**

1. An amorphous silicon thin film field effect transistor, particularly for use in liquid crystal display devices, said field effect transistor comprising:

an insulating substrate;

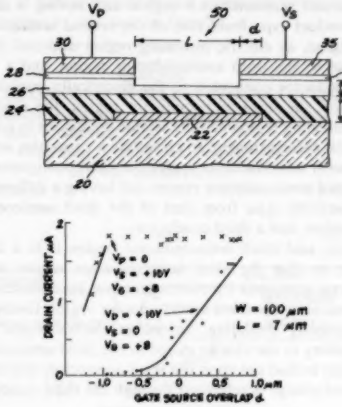
a gate electrode disposed on said insulating substrate;

an insulating layer disposed over said gate electrode;

an amorphous silicon layer disposed over said insulating layer, said amorphous silicon layer possessing a thickness t;

a drain electrode disposed on said amorphous silicon layer so as to partially overlie said gate electrode;

a source electrode disposed on said amorphous silicon layer



so as to define a channel region of length L in said amorphous silicon layer, said channel region extending in said amorphous silicon layer between said source electrode and said drain electrode, said source electrode overlying said gate electrode by a distance d;

said distance d being given approximately by $c\mu_e/(2L\alpha)$, where c is the gate capacitance per unit area, μ_e is the effective electron mobility in the amorphous silicon layer and α is the ratio between current density J in the direction from the gate electrode to the source electrode in the region of their overlap and the gate voltage raised to the power 2.

4,686,554

PHOTOELECTRIC CONVERTER

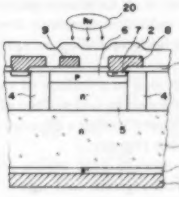
Tadahiro Ohmi, Sendai, and Nobuyoshi Tanaka, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 27, 1984, Ser. No. 625,130

Claims priority, application Japan, Jul. 2, 1983, 58-120751; Jul. 2, 1983, 58-120752; Jul. 2, 1983, 58-120753; Jul. 2, 1983, 58-120754; Jul. 2, 1983, 58-120755; Jul. 2, 1983, 58-120756; Jul. 2, 1983, 58-120757

Int. Cl.[4] H01L *27/14, 31/00*

U.S. Cl. 357—30 **74 Claims**



1. A photoelectric converter comprising a photosensor element, said photosensor element comprising:

a transistor including

a first semiconductor region having a first conductivity type, a first conductor, and an ohmic contact layer disposed between the first semiconductor region and the first conductor and comprising a semiconductor

having the same conductivity type as and a higher impurity concentration than the first semiconductor region,

a second semiconducor region disposed contiguous to the first semiconductor region, the second semiconductor region having the same conductivity type as and a lower impurity concentration than the first semiconductor region,

a third semiconductor region disposed contiguous to the second semiconductor region and having a different conduct type from that of the second semiconductor region, an electric insulating region disposed contiguous to the third semiconductor region, and a second conductor connected to the electrically insulating region; the third semiconductor region, the electrically insulating region and the second conductor in combination being arranged to constitute a capacitor; and

a fourth semiconductor region disposed contiguous to the third semiconductor region and having a different conductivity type from that of the third semiconductor region, and a third conductor;

whereby said third semiconductor region is in a floating state so that the third semiconductor region stores a charge generated by photoexcitation by controlling the potential of the third semiconductor region through said electrically insulating region, an electric signal corresponding to the charge stored in the third semiconductor region is read out from the third conductor, and then the stored charge is refreshed through the third conductor.

4,686,555

SOLID STATE IMAGE SENSOR

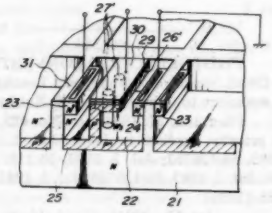
Atsushi Yusa, Ina; Jun-ichi Nishizawa, Sendai; Sohbe Suzuki, Sendai, and Takashige Tamamushi, Sendai, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Nov. 30, 1983, Ser. No. 556,347

Claims priority, application Japan, Dec. 14, 1982, 57-217755

Int. Cl.[4] H01L *27/14, 31/00*

U.S. Cl. 357—30 **4 Claims**



1. A solid state image sensor comprising a plurality of static induction transistors each forming a picture cell of the image sensor, each static induction transistor comprising:

a semiconductor body including an epitaxial layer provided on a substrate;

a drain region formed in a surface of said epitaxial layer;

a source region formed in said surface of said epitaxial layer, said epitaxial layer forming a channel region between said source and drain regions;

a signal charge storage gate region formed between said source and drain regions, said signal charge storage gate region comprising a buried gate region formed under said channel region and a surface gate region formed on said channel region, said buried and said surface gate regions being interconnected by means of a connection region; and

whereby said static induction transistor has a lateral structure in which a source-drain current flows in said channel region in parallel with said surface of said epitaxial layer.

4,686,556

PHOTOCATHODE FOR THE INFRA-RED RANGE

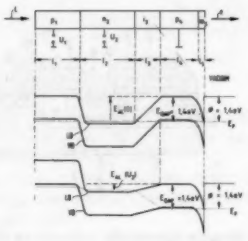
Klaus Dietrich, Paul-Keller-Str. 18, D-8035 Stockdorf, Fed. Rep. of Germany

Filed Nov. 13, 1985, Ser. No. 797,587

Claims priority, application Fed. Rep. of Germany, Nov. 16, 1984, 3441922

Int. Cl.[4] H01L *27/14*

U.S. Cl. 357—30 **7 Claims**



1. Photocathode for the infrared range, comprising a plurality of layers of semiconductive and conductive materials, forming a layer structure in which adjacent layers are arranged in the order of

a first, highly doped p-layer,

a second, highly doped n-layer,

a third, intrinsic layer,

a fourth, highly doped p-layer, and

a fifth, thin metal layer having a thickness of about an atomic layer of Cs,

the first, second and fourth layers be biased by predetermined voltages, and wherein the term highly-doped means a carrier concentration of at least 10^{18} cm^{-3}.

4,686,557

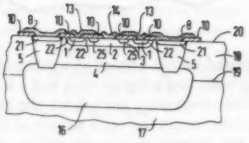
SEMICONDUCTOR ELEMENT AND METHOD FOR PRODUCING THE SAME

Peter Mahrla, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 290,332, Aug. 5, 1981, Pat. No. 4,511,912. This application Dec. 28, 1984, Ser. No. 687,201

Int. Cl.[4] H01L *29/72, 27/02, 29/06*

U.S. Cl. 357—34 **5 Claims**



1. Integrated bipolar power transistor arrangement including a plurality of parallel connected bipolar partial power transistors comprising: an epitaxial layer provided on a semiconductor substrate and forming contact connected collector regions for said partial power transistors, a buried layer region for said collector regions provided at the interface between said semiconductor substrate and said epitaxial layer; deep diffused collector contact regions projecting downward from the surface facing away from the substrate of the epitaxial layer into the buried layer, the contact connected collector region having an upper surface and being bounded by the buried layer and the collector contact regions; further comprising a com-

mon base region formed in the upper surface of the collector region including an inner contact-connected base region and an annular base region disposed around and concentrically with the inner base region, an annular emitter region disposed in said base region inside and concentrically with said annular base region, an annular barrier region formed in said base region inside said annular emitter region separating said inner base region and said annular base region, said barrier region extending downward partially into the base region, and annular barrier base-pinch resistance being formed by a space between the lower surface of said annular barrier region and the boundary between the collector region and the base region, said annular barrier resistance forming a connection between the inner contact-connected base zone and the annular base region.

4,686,558

CMOS MEMORY CELL HAVING AN ELECTRICALLY FLOATING STORAGE GATE

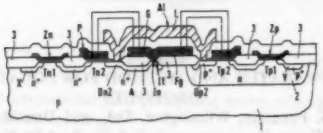
Fritz G. Adam, Freiburg, Fed. Rep. of Germany, assignor to ITT Industries, Inc., New York, N.Y.

Filed Sep. 1, 1983, Ser. No. 528,431

Claims priority, application European Pat. Off., Sep. 15, 1982, 82108483.7

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—42 **15 Claims**



1. Electrically programmable memory cell forming part of a memory matrix and which, in the form of a source-drain series arrangement of field-effect transistors, is composed of a coupling part and of a storage part comprising an electrically floating storage gate (Fg), said storage gate being capacitively couple to a control gate (G) and capable of being recharged by means of an injector device with a tunnel junction, wherein said series arrangement is located between a first bit line (X) and a second bit line (Y), and said control gate (G) is connected to a programming line (P);

characterized in that, said storage part comprises a pair of complementary field-effect memory transistors (Tn2, Tp2), with the drain regions thereof being connected to one another in the center point of the series arrangement by a conducting bridge;

the storage gates of the memory transistors (Tn2, Tp2) are connected to one another to form said storage gate (Fg) and comprise a continuous layer of polysilicon which is capable of being recharged by means of said injector device (I, In, Ip);

said control gate comprises the control gates (G) of the memory transistors (Tn2, Tp2) connected to one another;

each of said memory transistors (Tn2, Tp2) having its source side connected to the drain region of a select transistor (Tn1, Tp2) of the same conductivity type;

said select transistors (Tn1, Tp1) form the coupling part of the series arrangement, and each has its source side connected to one of said bit lines (X, Y) and each has its gate electrode connected to one of two word lines (Zn, Zp);

the drain regions of said memory transistors (Tn2, Tp2) are connected in the center point of said series arrangement to a read line (L) which is common to one matrix column;

the n-type channel transistors (Tn1, Tn2) are arranged in a p-doped substrate, and that the p-type channel transistors (Tp1, Tp2) are arranged in rows each said row of p-type channel transistors being formed in an n-doped substrate region (2), with said substrate region being divided in accordance with the rows; and

the n^+p-junction between the n-doped drain region of the n-type channel memory transistor (Tn2) and the p-doped substrate has a reverse current which is greater by a factor of 30 to 100 than the p^+n-junction between the p-doped drain region of the p-type channel memory transistor (Tp2) and the n-doped substrate region (Wn) when a voltage of 20 V is applied to said n-doped substrate region with respect to said first bit line (X).

4,686,559

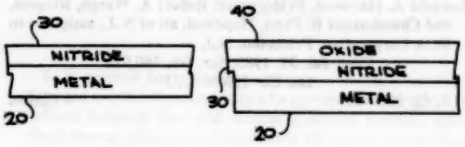
TOPSIDE SEALING OF INTEGRATED CIRCUIT DEVICE

Jacob D. Haskell, Palo Alto, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Aug. 3, 1984, Ser. No. 637,458

Int. Cl.[4] H01L *21/318*

U.S. Cl. 357—54 **8 Claims**



1. A process for hermetically sealing the topside metallized layer of an integrated circuit device which comprises the steps of depositing and defining a topside metallized layer on the integrated circuit device, depositing from 2000 to 6000 Angstroms of a sealing layer of a nitride compound directly on the surface of said topside metallized layer to form said hermetic seal and without depositing an oxide layer between said step of depositing said topside metallized layer and said step of depositing said nitride sealing layer, and then forming a protective layer over said nitride hermetic seal to protect said nitride sealing layer.

4,686,560

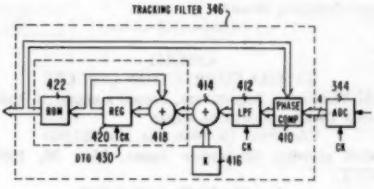
PHASE LOCKED LOOP SYSTEM INCLUDING ANALOG AND DIGITAL COMPONENTS

Alvin R. Balaban, Lebanon; Chandrakant B. Patel, Hopewell; Walter H. Demmer, Plainsboro, and Leopold A. Harwood, Bridgewater, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed May 30, 1986, Ser. No. 868,567

Int. Cl.[4] H04N *9/45, 9/66*

U.S. Cl. 358—19 **6 Claims**



1. In a digital signal processing system including a source of clock signal which may exhibit frequency instabilities, a phase locked loop system comprising:

an analog variable oscillator which is responsive to an analog control signal for generating a variable frequency oscillatory signal;

digitizing means including an analog-to-digital converter

coupled to said oscillator for generating a digital signal including N-bit digital samples representing said oscillatory signal at instants in time determined by said clock signal, where N is an integer greater than 1;

phase comparison means coupled to said analog-to-digital converter for generating a digital signal that is proportional to the difference in phase between the signal generated by said digitizing means and a reference signal; and

digital-to-analog converting means, responsive to the digital signals generated by said phase comparison means, for generating said analog control signal, said analog control signal conditioning the variable oscillator to change the frequency of said oscillatory signal in a sense tending to cause the signals provided by said phase comparison means to converge to a predetermined value.

4,686,561

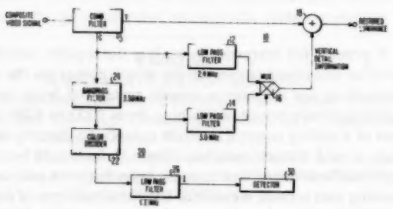
VERTICAL DETAIL INFORMATION RESTORATION CIRCUIT

Leopold A. Harwood, Bridgewater; Robert A. Wargo, Ringoes, and Chandrakant B. Patel, Hopewell, all of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Jul. 31, 1985, Ser. No. 760,910

Int. Cl.[4] H04N *5/21*

U.S. Cl. 358—31 **9 Claims**



1. In a system for processing a composite video signal, including a source of a comb filtered chrominance sigal and a source of a comb filtered luminance signal, a vertical detail information restoration circuit, comprising:

means coupled to said comb filtered chrominance signal source for producing a baseband color difference signal;

means coupled to said baseband color difference signal procuding means for detecting the presence of information in a relatively high frequency portion of said baseband color difference signal; and

means for combining a relatively low frequency portion of said comb filtered chrominance signal with said comb filtered luminance signal, wherein the bandwidth of said portion of said chrominance signal is varied responsive to said detecting means.

4,686,562

GAMMA CORRECTION CIRCUIT

Junichi Yamanaka, Sagamihara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 10, 1986, Ser. No. 837,960

Claims priority, application Japan, Mar. 30, 1985, 60-47705[U]

Int. Cl.[4] H04N *9/69, 5/202*

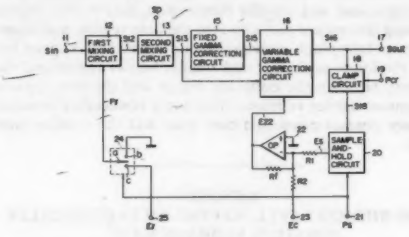
U.S. Cl. 358—32 **5 Claims**

1. A gamma correction circuit, comprising:

reference signal superimposing means for superimposing a reference signal within the blanking period of an input video signal;

variable gamma correction means for inputting the video signal superimposed with a reference signal by said reference signal superimposing means, and determining a correction value in response to an externally supplied control signal;

detection means for detecting a portion of the video signal corrected by said correction means that corresponds to said reference signal; and



correction value control means for comparing the detection level of said detection means with a control signal supplied to said gamma correction control means, varying said control signal and controlling the correction value of said variable gamma correction means based on this comparison result.

4,686,563

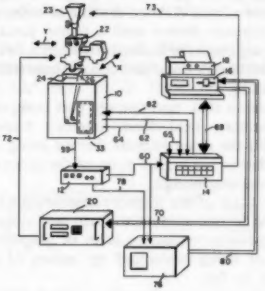
APPARATUS AND METHOD FOR LOCATING DROPOUTS

Frank S. Fountain, Wilmington, Del., and Donald K. Pusey, West Grove, Pa., assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 673,767, Nov. 21, 1984, abandoned. This application Jul. 29, 1985, Ser. No. 759,846

Int. Cl.[4] G11B *27/36;* **H04N** *5/782*

U.S. Cl. 360—38.1 **10 Claims**



1. In an apparatus including a dropout detector connected to a video tape player, the improvement comprising provision of

a positionable tape-inspecting instrument located adjacent the player,

guide and transport elements for diverting tape from its normal path of advance into and through a path where it can be inspected by said instrument,

a device for positioning the instrument, and

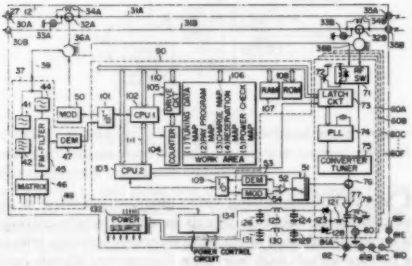
means interfaced with the detector, player and device for computing data, based on information recorded on the tape, as to the locations of dropouts, controlling tape advance and, with said data, positioning the instrument at the location of any detected dropout.

4,686,564

COMMUNICATION DATA PROCESSING DEVICE OF CABLE TELEVISION SYSTEM

Akinori Masuko; Wataru Kuroiwa, both of Fukaya; Shouji Uehara, Yokohama; Tsutomu Uekusa, Funabashi, all of Japan; Robert M. Rast, Englewood, and W. Sherwood Campbell, Littleton, both of Colo., assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan and American Television & Communications Corp., Englewood, Colo.

Filed May 30, 1985, Ser. No. 739,107
Claims priority, application Japan, May 30, 1984, 59-108625
Int. Cl.[4] H04N *7/10, 7/173*
U.S. Cl. 358—86 14 Claims



1. A communication data processing device of a cable television system comprising:

cable means for transmitting a communication signal consisting of forward data in a downstream direction from a central station and reverse data in an upstream direction to a central station, and a broadcast signal;

an external control unit including a converter tuner, connected to said cable means, for performing channel selection of the broadcast signal by frequency conversion of the broadcast signal to a reception channel signal compatible with a televison receiver;

a drop cable for transmitting the reception channel signal from said converter tuner to a subscriber processing unit, and for transferring data between the external control unit and the subscriber processing unit;

a memory in the external control unit having a pay program map for storing tuning data for receiving a pay program of the broadcast signal, and a reservation map for indicating reservation of the pay program by the subscriber processing unit;

the subscriber processing unit including means for transmitting reservation data to the external control unit so that the subscriber processing unit can reserve the pay program;

means in the external control unit for storing reservation data in the reservation map in response to receipt from the subscriber processing unit of the reservation data of the pay program;

mans for detecting in response to the communication signal from said cable means that the pay program has started;

means in the external control unit for searching the reservation map so as to detect whether a subscriber processing unit has reserved the pay program upon detecting that the pay program has started; and

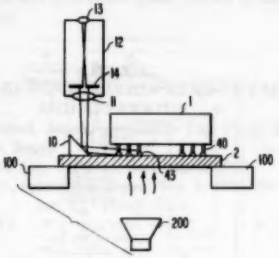
means in the external control unit for supplying the tuning data included in the pay program map to the converter tuner corresponding to the subscriber processing unit detected to have reserved the pay program.

4,686,565

METHOD AND APPARATUS FOR VISUALLY EXAMINING AN ARRAY OF OBJECTS DISPOSED IN A NARROW GAP

Moritoshi Ando, Atsugi, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed May 20, 1985, Ser. No. 735,744
Claims priority, application Japan, May 22, 1984, 59-104249
Int. Cl.[4] H04N *7/18*
U.S. Cl. 358—101 21 Claims



1. A method for visually examining a plurality of objects disposed to extend transversely of a gap approximately 1.5 mm defined between first and second generally parallel, spaced plates having respective, substantially flat inner surfaces facing the gap, the first plate being light transmissible and having an outer surface generally parallel to the inner surface thereof, comprising the steps of:

illuminating the outer surface of the first plate to produce diffused light within the gap which illuminates the objects and is emitted from an edge of the gap,

deflecting the light emitted from the edge of the gap in a direction substantially perpendicular to the inner surface of the first plate; and

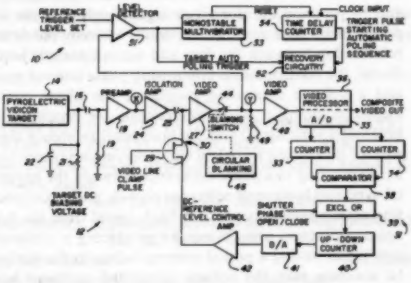
focusing the emitted light to form an image of a selected number of the objects.

4,686,566

AUTOMATIC INITIATION OF TARGET CROSSOVER RECOVERY IN A PYROELECTRIC CAMERA

Hans R. Bucher, Boulder, Colo., assignor to Xedar Corporation, Boulder, Colo.

Filed Jul. 28, 1986, Ser. No. 889,693
Int. Cl.[4] H04N *5/33*
U.S. Cl. 358—113 18 Claims



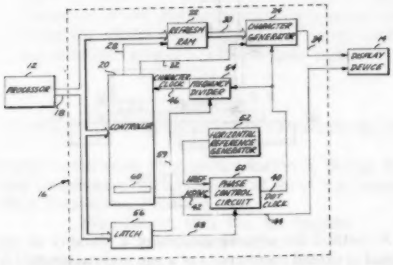
1. A system for automatic initiation of target crossover recovery in a pyroelectric camera having processing circuitry, said system comprising sensing means connected with said processing circuitry of said pyroelectric camera for sensing the presence of an electrical signal at said processing circuitry indicative of target crossover and, responsive thereto, providing a trigger output for initiating target crossover recovery.

4,686,567

TIMING CIRCUIT FOR VARYING THE HORIZONTAL FORMAT OF RASTER SCANNED DISPLAY

William S. Burdick, Indialantic, Fla., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Sep. 28, 1984, Ser. No. 656,028
Int. Cl.[4] H04N 5/06
U.S. Cl. 358—150 7 Claims



1. A timing circuit for a digital system that includes a raster scanned display device that includes a horizontal deflection transformer, the display device being adapted to scan a beam through a series of horizontal scan lines at a horizontal scanning rate controlled by a periodic horizontal sync signal having a first period, each horizontal scan line comprising dots that can be individually and selectively illuminated in response to data provided at a rate controlled by a periodic dot clock signal having a second period, the digital system further including means for producing horizontal format data that represents a desired relationship between the first and second periods, the timing circuit comprising:

means for generating a periodic horizontal reference signal having a third period; and

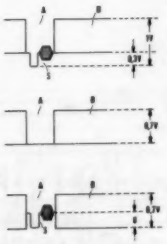
phase lock loop means for producing the horizontal sync signal and the dot clock signal, the phase lock loop means including means for generating the horizontal sync signal from the dot clock signal based upon the horizontal format data, and control means connected to receive the horizontal sync signal and the horizontal reference signal and to produce the dot clock signal such that the first period is the same as the third period, whereby the desired relationship between the first and second periods is produced, the control means comprising phase control means and a voltage controlled oscillator, the phase control means including a phase comparator for receiving the horizontal sync signal and the horizontal reference signal and for producing a control signal having a voltage level corresponding to a phase difference between the horizontal sync and horizontal reference signals, and a compensation circuit responsive to a flyback signal from the horizontal deflection transformer for producing a compensation signal having a period corresponding to the horizontal scanning rate, the voltage controlled oscillator being connected to receive the control and compensation signals and to produce the dot clock signal, the voltage controlled oscillator including means for responding to said voltage level by producing the dot clock signal having the second period, and means for responding to the compensation signal by varying the second period during each horizontal scan line so as to compensate for nonlinearities in the horizontal scanning rate of the display device.

4,686,568

METHOD OF INCREASING THE DYNAMIC RANGE AND REDUCING QUANTIZATION NOISE OF VIDEO SIGNALS

Otto Weitzel, Stadtallendorf, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 17, 1985, Ser. No. 692,307
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1984, 3402796
Int. Cl.[4] H04N 5/06
U.S. Cl. 358—150 2 Claims



1. Method of minimizing video quantization noise in digitalized composite televison signals in which synchronizing signals appear interposed in blanking intervals between television-line picture signals said television line picture signals occupying a predetermined range of values available for them, and said synchronizing signals including discrete synchronization pulses and wave bursts of a synchronization frequency, including the steps of:

providing from a tabular memory containing stored data representing a digital discrete synchronization pulse and a digital synchronizing frequency wave burst, in response to a television blanking signal representing said blanking intervals, said stored data representing said digital discrete pulse and said digital wave burst occupying the same range of values as said television-line picture signals and said stored data being provided within each of said blanking intervals from said memory in synchronized sequence corresponding to the sequence of said pulses and bursts of said synchronizing signals, and

substituting, by a switching operation during said blanking intervals, said stored data representing said digital synchronization pulse and said digital wave burst provided from said memory for the synchronization pulses and the waves bursts of said digitalized composite television signals,

whereby digitalized modified composite signals are produced comprising said television-line signals and said stored data provided from said memory occupying said same range of values.

4,686,569

CIRCUITRY FOR REDUCING DEMODULATION PHASE ERROR AS FOR AN AUTOMATIC DEGHOSTING SYSTEM

Edward R. Campbell, III, Tabernacle Township, Burlington County, and Henry G. Lewis, Jr., Hamilton Square, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed May 29, 1986, Ser. No. 868,113
Int. Cl.[4] H04N 5/21
U.S. Cl. 358—167 11 Claims

1. Circuitry for synchronously demodulating radio frequency television signals comprising:

an input terminal for applying a radio frequency television signal having a direct including a direct carrier signal and a delayed direct signal component including a delayed direct carrier signal, wherein said radio frequency television signal includes a carrier signal which is a vector sum

of said direct carrier signal and said delayed direct carrier signal;

means coupled to said input terminal for extracting the carrier signal from said radio frequency television signal;

means, including a phase locked loop responsive to said extracted carrier signal and to a phase control signal, for generating an oscillatory signal having a frequency and phase determined by said extracted carrier signal and said phase control signal;

detection means coupled to said input terminal and responsive to said radio frequency television signal and to said oscillatory signal for generating a baseband signal representing amplitude modulated information carried by said radio frequency television signal; and

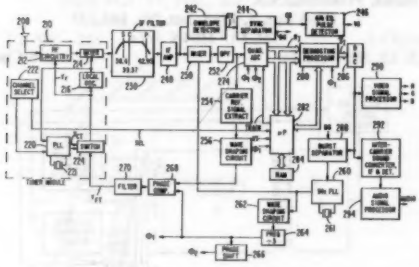
means coupled to said detection means and responsive to the magnitude of said baseband signal at first and second predetermined instants for generating said phase control signal, being proportional to a phase angle by which said oscillatory signal differs from having a predetermined phase relationship with said direct carrier signal, said phase control signal tending to change, the phase of said oscillatory signal in a sense to reduce the magnitude of said phase control signal.

4,686,570

ANALOG-TO-DIGITAL CONVERTER AS FOR AN ADAPTIVE TELEVISION DEGHOSTING SYSTEM

Henry G. Lewis, Jr., Hamilton Square, and Sheau-Bao Ng, Plainsboro, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Dec. 24, 1985, Ser. No. 813,255
Int. Cl.[4] H04N 5/40
U.S. Cl. 358—188 **3 Claims**



1. Apparatus for developing digital samples representing input signals which include a carrier signal modulated by baseband signals comprising:

an input terminal for applying said input signals;

means for developing a clock signal having a predetermined frequency, said clock signal having first and second phases that are mutually quadrature phase related;

means, coupled to said input terminal and to said clock signal developing means, for processing said input signals to produce processed signals including a further carrier signal modulated by said baseband signals wherein said further carrier signal is substantially locked in frequency and phase to one of the first and second phases of said clock signal; and

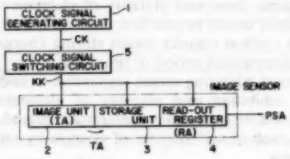
analog-to-digital converting means coupled to said input signal processing means and responsive to said first and second phases of said clock signal for alternately sampling said processed signals at instants determined by said first and second phases of said clock signal, respectively, to develop digital samples which alternately represent components of said processed signals that are respectively in-phase with and quadrature phase related to said further carrier signal.

4,686,571

PICTURE IMAGE INFORMATION READ-OUT METHOD AND APPARATUS

Kenji Suzuki, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Ashigara, Japan

Filed Aug. 21, 1985, Ser. No. 767,909
Claims priority, application Japan, Sep. 5, 1984, 59-185898
Int. Cl.[4] H04N 3/14
U.S. Cl. 358—213 **5 Claims**



1. An apparatus for reading out image information which comprises:

circuit means for generating a clock signal regarding image information;

circuit means in which said clock signal from said clock signal generating circuit means is processed so as to have first and second frequencies and which generates a clock signal in a switched manner to generate a clock signal having the first frequency or second frequency;

a unit for photoelectrically converting the image signal in synchronism with the clock signal from the clock signal switching circuit means;

a unit for accumulating the image information with the first frequency transferred from said photoelectrically converting unit; and

a unit for reading out a stored image information with the second frequency which is low rate compared with the first frequency.

4,686,572

DRIVING DEVICE FOR INTERLINE-TRANSFER CCD FOR USE IN ELECTRONIC STILL CAMERA

Norihiko Takatsu, Tokyo, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Nov. 13, 1985, Ser. No. 797,490
Claims priority, application Japan, Nov. 19, 1984, 59-243992
Int. Cl.[4] H04N 3/14
U.S. Cl. 358—213.13 **4 Claims**

1. An electronic still picture camera comprising:

(a) a plurality of elements each of which generates charges corresponding to the intensity of incident light thereon and stores charges therein;

(b) horizontal transfer means;

(c) vertical transfer means;

(d) transfer gate means;

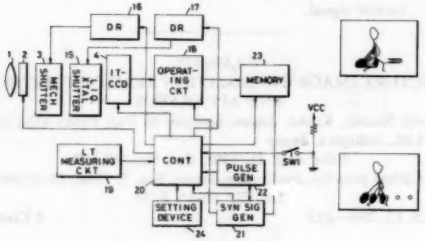
(e) first driving means for driving said transfer gate means so that said transfer gate means transfers charges generated

by said plurality of elements to said vertical transfer means;

(f) second driving means for driving said vertical transfer means so that said vertical transfer means transfers charges to said horizontal transfer means;

(g) first inhibiting means for inhibiting said second driving means from driving said vertical transfer means for a first predetermined period of time;

(h) control means for controlling said first driving means so



that said transfer gate means transfers charges a plurality of times from said plurality of elements to said vertical transfer means in said first predetermined period of time, said vertical transfer means storing charges for said first predetermined period of time; and

(i) second inhibiting means responsive to said control means for inhibiting said plurality of elements from storing charges for a second predetermined period of time following each of said transfer of charges by said transfer gate means.

4,686,573

CHARGE TRANSFER TYPE IMAGE PICKUP APPARATUS FOR PRODUCING FIELD-INTERLACED VIDEO SIGNALS

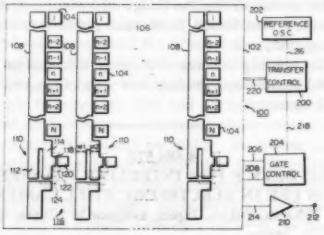
Jin Murayama; Ryuji Kondo; Hiroshi Tamayama; Takashi Yano, and Makoto Shizukuishi, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 31, 1986, Ser. No. 824,873

Claims priority, application Japan, Feb. 5, 1985, 60-19305

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.22 **4 Claims**



1. A solid-state image pickup apparatus of a charge transfer type comprising:

a solid-state image pickup device having a photosensitive cell array including a plurality of photosensitive cells arranged in an array; and

first control means for effecting a clock drive on said solid-state image pickup device to cause said device to deliver two fields of video signals subjected to interlaced scanning,

said solid-state image pickup device including:

charge divide means for sequentially receiving charges generated in photosensitive cells of a horizontal line, a plurality of charges associated with each pixel, to divide the plurality of charges of each pixel into two groups;

discharge means for discharging one of the two groups of charges; and

output means responsive to said first control means for sequentially receiving charges from said charge divide means to sequentially produce video signals of a horizontal line,

said solid-state image pickup apparatus further including second control means for controlling said charge divide means and said discharge means,

said first control means effecting a clock drive on said charge divide means to sequentially transfer charges from said photosensitive cells, and said second control means controlling said charge divide means and said discharge means, so that,

for one of said two fields subjected to interlaced scanning, charges generated by said photosensitive cells of odd-numbered lines are transferred to said output means, and one of the two groups of charges for even-numbered horizontal lines adjacent to odd-numbered horizontal lines are discharged by said discharge means so that said output means effects addition with weight on charges from said photosensitive cells of the odd- and even-numbered horizontal lines to produce video signals of the odd-numbered horizontal lines, and

for the other of the two fields, charges generated by said photosensitive cells of even-numbered horizontal lines are transferred to said output means, and one of the two groups of charges for odd-numbered horizontal lines adjacent to the even-numbered lines are discharged by said discharge means so that said output means effects addition with weight on charges from said photosensitive cells of the even- and odd-numbered horizontal lines to produce video signals of the even-numbered horizontal lines.

4,686,574

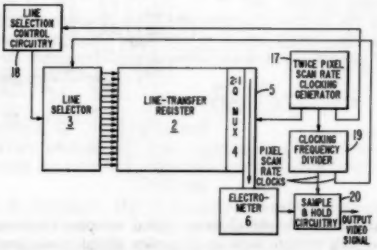
LINE-SEQUENTIAL READ OUT OF A PHOTOTSENSOR ARRAY VIA A CCD SHIFT REGISTER CLOCKED AT A MULTIPLE OF PIXEL SCAN RATE

Harry G. Erhardt, East Windsor, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Apr. 4, 1986, Ser. No. 848,223

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.26 **5 Claims**



1. A method of reducing differential time delay between the responses at the output end of a serially side-loaded CCD shift register for input signals serially side-loaded at a first rate into different stages of a said CCD shift register, said method comprising the steps of:

forward clocking said CCD register at a second rate, said second rate being at least twice said first rate; and

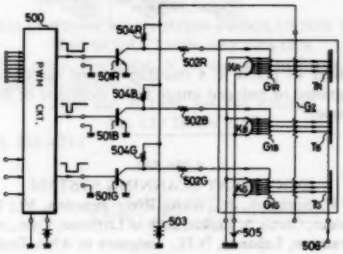
subsampling at said first rate the responses at the output end of said CCD register.

4,686,575

VERY LARGE COLOR VIDEO MATRIX DISPLAY APPARATUS WITH CONSTANT-CURRENT DISPLAY CELLS DRIVEN BY PULSE-WIDTH-MODULATED VIDEO SIGNALS

Satoshi Shimada, Kanagawa, and Yuji Watanabe, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 25, 1985, Ser. No. 694,955
Claims priority, application Japan, Feb. 2, 1984, 59-19035
Int. Cl.[4] H04N *3/12, 9/12, 9/16;* G09G *3/20*
U.S. Cl. 358—240 6 Claims



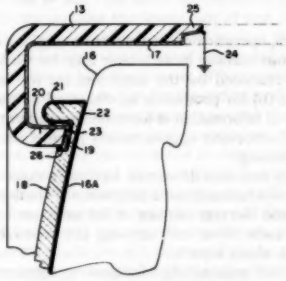
1. A video display system comprising: a display device including a plurality of luminescent display cells arranged in an X-Y matrix form, each of said display cells having a cathode, a grid electrode and a luminescent target electrode; a video signal source for supplying a video signal; and driving means for supplying said video signal to each of said display cells so that each of said display cells is turned on and off as a function of the level of said video signal and a picture is reproduced on said display device, characterized in that when said driving means turns on each of said display cells a constant current flows therethrough.

4,686,576

CONDUCTIVE SCREEN FOR VIDEO DISPLAY UNIT

Robert G. Dickie, New Market, and Martin E. Hobbins, Richmond Hill, both of Canada, assignors to Northern Technologies, Ltd., Markham, Canada

Filed Mar. 17, 1986, Ser. No. 840,393
Int. Cl.[4] H04N *5/65, 5/72*
U.S. Cl. 358—245 3 Claims



1. In a video display unit of the type including a cathode ray tube and a housing for said cathode ray tube having a bezel with an opening for viewing the face of said cathode ray tube, the improvement comprising:

a faceplate through which the face of said cathode ray tube can be viewed;

a conductive screen between said faceplate and the face of said cathode ray tube;

a groove around the periphery of said faceplate on the outside surface thereof, said groove containing at least a portion of said screen; and

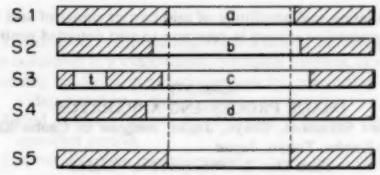
a ridge on said bezel mating with the groove in said faceplate for holding said screen and for electrically connecting said screen to said bezel.

4,686,577

ORIGINAL READING APPARATUS WITH POSITIONING CHECK

Shinobu Arimoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1984, Ser. No. 677,096
Claims priority, application Japan, Dec. 8, 1983, 58-230643
Int. Cl.[4] H04N *1/00, 1/40, 1/10*
U.S. Cl. 358—256 12 Claims



1. An original reading apparatus comprising:

reading means for reading an original document and for producing an image signal;

detecting means for detecting an image signal representing the original document from the image signal signals supplied from said reading means, according to the status of plural image signals in a predetermined two-dimensional area of a predetermined size, wherein said detecting means is adpated to detect that the plural signals contained in an area of a predetermined size are signals representing white images; and

discriminating means for discriminating a characteristic relating to the original document in accordance with the detection result of said detecting means, the discriminated characteristic being one of the group consisting of: (i) a position of the original document, and (ii) a size of the original document.

4,686,578

GII/GIII TRANSMISSION SYSTEM

Hideo Asano, Machida, Japan, assignor to International Business Machines Corporation, Armonk, N.Y.

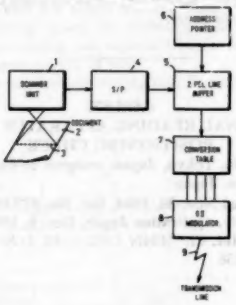
Filed Nov. 16, 1984, Ser. No. 672,011
Claims priority, application Japan, Nov. 22, 1983, 58-218870
Int. Cl.[4] H04N *1/40*
U.S. Cl. 358—280 10 Claims

1. A method for transmitting data representing PELs of an image each of said PELs having a given size, in which said size of said PEL is smaller than the size of a PEL in digital GII transmission mode through GII transmission system using AM-PM-VSB wherein said GII transmission system includes a carrier signal having a given amplitude, comprising the steps of;

scanning said image for producing PEL data representing white or black levels of said small size PELs of said image;

sampling said PEL data by a sample window which is equal to said size of PEL in digital GII transmission mode, said white or black PEL data occupying a specific position in said sample window;

detecting said position of said white or black PEL data in said sample window; and



modulating said amplitude of said carrier signal of said GII transmission system in response to said detected position.

4,686,579

IMAGE PROCESSING APPARATUS

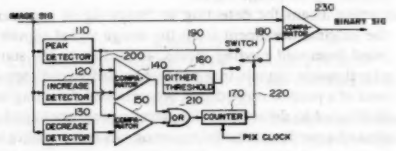
Masahiro Sakamoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 2, 1985, Ser. No. 783,148

Claims priority, application Japan, Oct. 11, 1984, 59-211477

Int. Cl.[4] H04N 1/40

U.S. Cl. 358—282 17 Claims



1. An image processing apparatus comprising:

input means for inputting pixel data;

means for processing the pixel data inputted from said input means;

peak value detection means for detecting a peak value of the pixel data inputted from said input means;

discriminating means for detecting an amount of change in density level of the pixel data and discriminating an image content relating to the pixel data for each pixel by using a detected amount of change in density level and an output from said peak value detecting means; and

means for selecting a process mode of said processing means in accordance with the results of said discrimination.

4,686,580

METHOD AND APPARATUS FOR CHANGING IMAGE SIZE

Yuzo Kato, Yokohama, and Hidetoshi Suzuki, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 6, 1984, Ser. No. 577,250

Claims priority, application Japan, Feb. 10, 1983, 58-20735; Mar. 31, 1983, 58-56216

Int. Cl.[4] H04N 1/04

U.S. Cl. 358—287 17 Claims

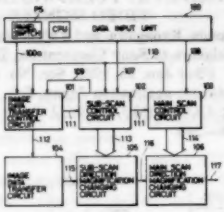
1. A method for changing a magnification of an image comprising the steps of:

dividing the image into a number of divisional images;

magnifying the divisional images; and

combining the magnified divisional images,

wherein, for a magnification in a range of (1, 2) or ($\frac{1}{2}$, 1), the image is divided into the divisional images such that each divisional image has a number of pixels which causes the



number of pixels in a one-dimensional direction of the magnified or reduced image to be increased or decreased by one.

4,686,581

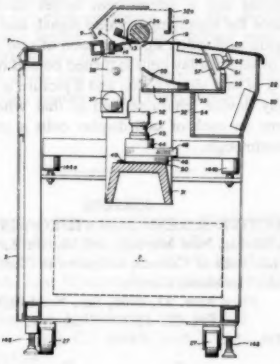
DOCUMENT SCANNING SYSTEM

Charles W. Spehrley, Jr., White River Junction, Vt.; Gary W. Schneider; Curtis A. Lipkie, both of Littleton, Colo., and Dean H. Cranston, Lebanon, N.H., assignors to ANA Tech Corporation, Littleton, Colo.

Filed Aug. 9, 1985, Ser. No. 764,295

Int. Cl.[4] H04N 1/12

U.S. Cl. 358—294 7 Claims



1. A system, operative on a substrate having (i) a rear surface and (ii) a front surface from which may be viewed graphic information recorded on the substrate, (a) for scanning the substrate and (b) for producing an electrical output related to the intensity of information at identifiable locations along each of a series of successive approximately parallel stand lines, the system comprising:

a rotattably mounted drive roll, having an outer surface and an axis of rotation about a first axis, for frictionally engaging aganist the rear surface of the substrate and, on rotation of such drive roll, moving the substrate, when so engaged, along a path;

bail means for maintaining frictional engagement of the rear surface of the substrate against the outer surface of the drive roll and for maintaining flatness of the substrate against such outer surface along a grip line that is approximately parallel to the first axis,

the bail means including a bail having a straight edge loaded against the outer surface of the drive roll, such bail providing relatively less frictional force against the front surface of the substrate than is provided by the drive roll against the rear surface of the substrate,

the bail further including a flat spring having a first longitu-

dinal edge constituting the straight edge and the second longitudinal edge along which the spring is mounted so as to load the first edge aganist the outer surface of the drive roll;

drive means, for driving the drive roll, so that the substrate is moved along the path when the drive means is actuated;

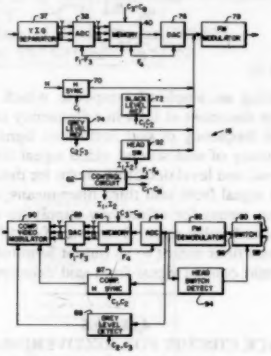
camera means, for viewing the substrate form the front surface thereof along a scan line that is generally parallel to, and proximate to, the grip line and for producing an electrical output related to the intensity of the information at identifiable locations along the scan line.

4,686,582

HEAD SWITCHING IN HIGH RESOLUTION VIDEO REPRODUCTION APPARATUS

John D. Lovely, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 6, 1986, Ser. No. 816,522
Int. Cl.[4] H04N 9/87
U.S. Cl. 358—310 **6 Claims**



1. Video reproduction apparatus comprising:

circuit means for providing a field of a color video signal having a plurality of horizontal lines in a time-division-multiplex (TDM) format including a compressed horizontal sync service signal and compressed video component signals arranged in time sequential order, said field including a first set of horizontal line signals representing the upper half of said field and a second set of horizontal line signals representing the lower half of said field;

means for producing a head switch signal in the compressed horizontal sync service signal of designated horizontal line signal at the end of the first set of horizontal line signals;

magnetic transducer means for recording said TDM format color video signal on magnetic tape such that said first set of horizontal line signals are recorded on a first track on said tape and said second set of horizontal line signals are recorded on a second adjacent track on said tape;

said magnetic transducer means being operable in a playback mode for sequentially reproducing said first and second sets of horizontal line signals respectively from said first and second tracks on said tape and for providing said first and second sets of signal to first and second input paths;

switch means electrically coupled between said first and second input paths and an output path; and

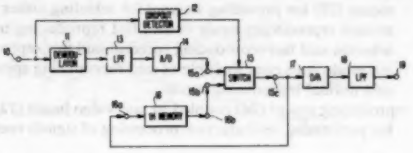
means for detecting said head switch signal in said designated horizontal line at the end of said first set of horizontal line signals and for actuating said switch means to switch the video signal applied to said output path between said first and second input paths such that said switch between paths is effected during the horizontal sync service interval of said designated horizontal line signal containing said head switch signal.

4,686,583

DROPOUT COMPENSATING APPARATUS USING A DIGITAL DELAY CIRCUIT

Masao Tomita, Neyagawa; Akio Hashima, Tsuzuki; Haruo Ohta, Neyagawa, and Tadaaki Matsuo, Noriguichi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 17, 1984, Ser. No. 662,453
Claims priority, application Japan, Oct. 18, 1983, 58-194559
Int. Cl.[4] H04N 5/76
U.S. Cl. 358—336 **5 Claims**



1. A dropout compensating apparatus for eliminating a dropout contained in a video signal recording medium, comprising:

analog to digital converting means for converting an input video signal to a digital signal;

digital delaying means for delaying a digital signal by a specified period;

dropout detecting means responsive to an input video signal containing a dropout for producing a dropout detected signal;

digital to analog converting means for converting a delayed digital signal from said digital delaying means to a delayed video signal;

first switch means having two input terminals respectively connected with an output terminal of said analog to digital converting means and an output of said digital delaying means and an output terminal connected with an input terminal of said digital delaying means, said first switch means being responsive to said dropout detected signal for selectively connecting the two input terminals with the output terminal thereof so that the digital delayed signal from the digital delaying means is applied to the input terminal of said digital delaying means only when the input video signal contains a dropout; and

second switch means responsive to said dropout detected signal for selectively passing the input video signal and the delayed video signal from said digital to analog converting means so that the delayed video signal from said digital to analog converting means is passed through said second switch means only when the input video signal contains a dropout, thereby to obtain a dropout compensated video signal.

4,686,584

VIDEO SIGNAL REPRODUCTION APPARATUS AND METHOD HAVING NOISE REDUCTION FOR FAST VIDEO REPRODUCTION

Masanori Kojima, and Masaharu Hayakawa, both of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1984, Ser. No. 664,881
Claims priority, application Japan, Nov. 29, 1983, 58-227205
Int. Cl.[4] H04N 5/783, 5/93
U.S. Cl. 360—10.3 **7 Claims**

1. A magnetic video reproducing apparatus capable of reproducing a video signal recorded in a recording medium at a normal reproducing speed and at a fast reproducing speed faster than said normal reproducing speed, said reproducer

employing a rotating head system in which a plurality of video heads (12, 13) are mounted on the circumference of a rotating drum (11),

a helical scanning system in which said recording medium is

adapted to travel slantingly with respect to the direction of rotation of said video heads (12, 13), and

an azimuth system in which said plurality of video heads (12, 13) have gaps provided at azimuth angles different from each other,

said recording medium having recorded a composite video signal including a vertical synchronizing signal,

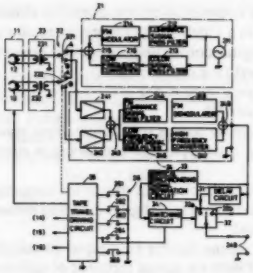
said magnetic video reproducing apparatus including:

a capstan for mechanically driving said recording medium;

driving control means (25) for driving said capstan at a normal reproducing mode or at a fast reproducing mode;

mode selection means (26) coupled to said driving control means (25) for providing a signal for selecting either said normal reproducing mode or said fast reproducing mode wherein said fast reproducing speed in said fast reproducing mode is an even multiple of said reproducing speed in said normal reproducing mode;

reproducing means (24) coupled to said video heads (12, 13) for performing reproduction processing of signals read by



said video heads (12, 13) from said recording medium thereby to output a reproduced composite video signal;

delay means (31) coupled to said reproducing means (24) for delaying said reproduced composite video signal for a predetermined period of time thereby to output a delayed reproduced composite video signal;

vertical synchronizing signal generating means (33) for generating a vertical synchronizing signal in synchronization with said vertical synchronizing signal included in said composite video signal; and

switching means (32, 34) coupled to said reproducing (24) means and said delay means (31), as well as coupled to said mode selection means (26) and said vertical synchronizing signal generating means (33) for selectively passing said reproduced composite video signal or said delayed composite video signal at regular intervals in synchronization with said vertical synchronizing signal from the vertical synchronizing signal generating means when supplied with said signal for selecting said fast reproducing mode.

4,686,585

VTR HAVING AUTOMATIC CARRIER DETECTION

Ichitaro Sato, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 11, 1985, Ser. No. 700,732

Claims priority, application Japan, Feb. 13, 1984, 59-24749

Int. Cl.[4] **H04N** *5/78, 9/491*

U.S. Cl. 360—33.1 **12 Claims**

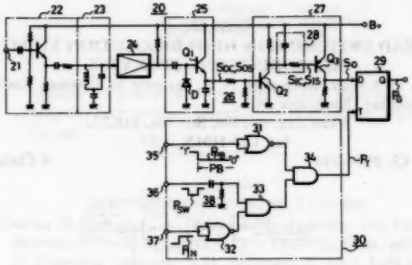
1. Apparatus for reproducing from a magnetic tape a recorded video signal which is one of first and second video signals which have been frequency-modulated on first and second carriers, respectively, said first carrier having a frequency lower than that of said second carrier, comprising:

means for demodulating a video signal reproduced from said tape to provide a demodulated video signal;

first low-pass filter means having a first cut-off frequency for filtering said demodulated video signal;

second low-pass filter means having a second cut-off frequency higher than said first cut-off frequency for filtering said demodulated video signal;

means connected before said demodulating means and responsive to the reproduced video signal before demodulation for detecting whether the reproduced video signal is said first or second video signal and for generating a control signal in response thereto, said detecting means including third filter



means having an amplitude response which monotonically increases or decreases at least in a frequency range between a lower limit frequency of said first video signal and an upper limit frequency of said second video signal for producing an output signal, and level detecting means for detecting a level of the output signal from said third filter means; and

switching means for selectively supplying the filtered demodulated video signal from one of said first and second low-pass filter means to an output terminal in accordance with said control signal from said detecting means.

4,686,586

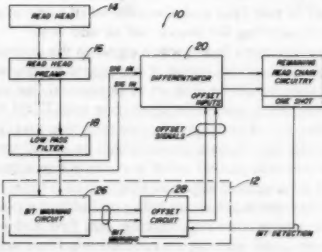
READ BACK CIRCUIT FOR RECOVERING DATA FROM MAGNETIC STORAGE MEDIUM

Alan P. Dutcher, Bensalem, Pa., assignor to Oki America, Inc., Hackensack, N.J.

Filed Jan. 21, 1986, Ser. No. 820,299

Int. Cl.[4] **G11B** *5/09, 5/02*

U.S. Cl. 360—46 **20 Claims**



1. A read back circuit for recovering data stored on a magnetic medium as a series of magnetic flux transitions comprising:

(a) first means for providing a read signal indicative of magnetic flux transitions on the medium;

(b) second means operatively coupled to the first means for providing a differentiated read signal having zero crossings indicative of peaks in the read signal; and

(c) third means operatively coupled to the second means for normally applying an offset to the differentiated read signal and for temporarily removing the offset during the

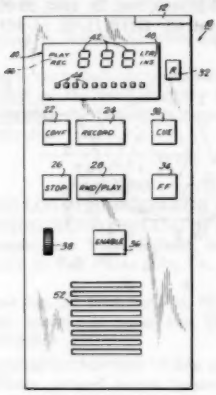
occurrence of peaks in the read signal thereby preventing erroneous zero crossings of the differentiated read signal and wherein the third means comprises phase shifting means operatively coupled to the first means for delaying the phase of the read signal by a prescribed amount and thereby providing a delayed read signal having zero crossings that occur before corresponding zero crossings of the differentiated read signal.

4,686,587

RECORD AND/OR PLAYBACK DEVICE WITH CUE SIGNAL INDICATION AND ACCESS

Betsy Hipp, Orange; Jeremy Saltzman, Norwalk, and John J. Dwyer, Stratford, all of Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Dec. 21, 1983, Ser. No. 564,191
Int. Cl.[4] G11B *15/54, 15/52*
U.S. Cl. 360—74.2 **18 Claims**



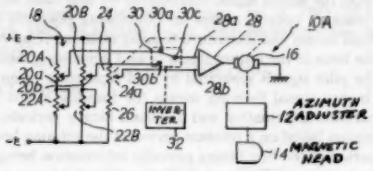
1. In a record/playback device for recording information on and playing information back from a movable record medium, counting means responsive to signals produced when said record medium moves to provide a count representing the relative position of said record medium; cue switch means selectively operable to generate a cue indication; cue memory means having plural storage locations for storing in the next available one of said storage locations the count provided by said counting means at the time that said cue indication is generated; means for bidirectionally moving said record medium; means for comparing the count provided by said counting means to the counts stored in said cue memory means; means for stopping said record medium when said count provided by said counting means is substantially equal to a count stored in a storage location; and processor apparatus operable in accordance with a cyclical programmed set of instruments including a routine for sensing when said cue switch means is operated, presetting a cue timer when the operation of said cue switch means is sensed, incrementing said cue timer, and loading the count provided by said counting means into said next available storage location when said cue timer is incremented to a predetermined value, said processor apparatus also including means for producing signals as said record medium moves.

4,686,588

AZIMUTH ADJUSTMENT APPARATUS FOR A MAGNETIC HEAD

Hideo Goto, Tachikawa, and Akira Imamura, Tokyo, both of Japan, assignors to Nakamichi Corporation, Tokyo, Japan

Filed Oct. 26, 1984, Ser. No. 665,441
Claims priority, application Japan, Nov. 1, 1983, 58-169764; Nov. 9, 1983, 58-173485
Int. Cl.[4] G11B *5/56*
U.S. Cl. 360—76 **5 Claims**



1. Manual azimuth adjustment means for a magnetic head comprising:

azimuth instruction means including variable resistor means having a first manually variable resistor, a second variable resistor having a variable terminal moved in accordance with rotation of a control motor and a third variable resistor connected to said first manually variable resistor to determine a reference azimuth position of said magnetic head when said first manually variable resistor is positioned at a detent neutral point, and circuit means to generate a variable amplitude azimuth control signal based on the value of said second variable resistor compared with a combination of said first and third variable resistors;

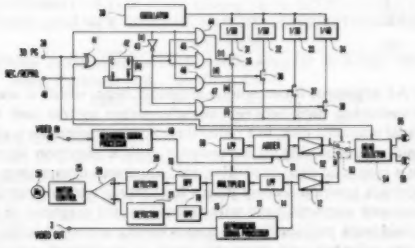
and means including said control motor electrically connected to said azimuth instruction means to be responsive to said azimuth control signal and physically connected to said magnetic head to vary the azimuth position of said magnetic head, so that said azimuth position of said magnetic head can be manually adjusted to an appropriate azimuth position by said first variable resistor while in a playback operation.

4,686,589

RECORDING AND REPRODUCING APPARATUS HAVING AN AUTOMATIC TRACKING CONTROL SYSTEM USING MULTIPLE PILOT SIGNALS

Hiroyuki Takimoto, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha

Continuation of Ser. No. 559,222, Dec. 8, 1983, abandoned. This application Nov. 26, 1986, Ser. No. 936,974
Claims priority, application Japan, Dec. 13, 1982, 57-219061
Int. Cl.[4] G11B *5/52, 15/467*
U.S. Cl. 360—77 **8 Claims**



1. An information signal recording and reproducing apparatus having an automatic tracking control system, comprising:

(a) generating means for selectively outputting four kinds of

pilot signals having different frequencies from one another;

(b) adding means for adding an output signal of said generating means onto an information signal to form an added signal;

(c) recording and reproducing head means for recording the added signal onto a record bearing medium and for reproducing the added signal from the record bearing medium, said recording and reproducing head means including at least one rotating head;

(d) separating means for separating four kinds of pilot signals from the added signal reproduced by said head means;

(e) tracking control means for controlling positions of said head means and the record bearing medium, relatively, on the basis of the output signal of said generating means and the pilot signals separated by said separating means;

(f) binary signal forming means for forming a first binary periodic information and a second binary periodic information based on a rotation period of the rotating head, the period of the first binary periodic information being equal to two times the period of the second binary periodic information;

(g) selection control means for controlling a selecting action of said generating means based on the first binary periodic information and the second binary periodic information;

(h) manually operable means for producing a mode designation signal by which the apparatus is switched between a first mode, where said head means is performing a recording operation, and a second mode, where said head means is performing a reproducing operation; and

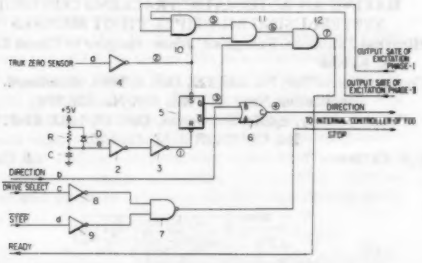
(i) phase shifting means for shifting phases of the first binary periodic information and the second binary periodic information supplied to the selection control means, on the basis of the mode designation signal.

4,686,590

APPARATUS FOR POSITIONING A MAGNETIC HEAD

Shinpei Kunii, Ohme, and Masao Fujiki, Tachikawa, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 28, 1985, Ser. No. 749,726
Claims priority, application Japan, Jun. 29, 1984, 59-134380
Int. Cl.[4] G11B *21/08, 21/02*
U.S. Cl. 360—78 **4 Claims**



1. An apparatus for moving a magnetic head, which is used in transferring data between an information system and an external magnetic disk, in a radial direction to a reference track of said magnetic disk in accordance with a direction signal from a magnetic disk controller, said apparatus comprising:

(a) track position sensing means for sensing a track position of said magnetic head with respect to said magnetic disk, said track position sensing means having an output indicating whether said magnetic head is positioned radially inward or outward of positions within a predetermined vicinity of said reference track;

(b) reset means for providing a set signal for a predetermined time commencing when a potential is applied to said reset means;

(c) first logic means responsive to said output of said track position sensing means and said set signal for providing a first binary control signal for use in selecting the direction of movement of said magnetic head;

(d) second logic means responsive to said direction signal from said magnetic disk controller and said first binary control signal for providing a second binary control signal operative to set the direction of movement for said magnetic head, said second binary signal being operative to set a direction of movement in accordance with said direction signal from said magnetic disk controller when said first binary control signal is in a first binary state, and being operative to set a direction of movement in accordance with a predetermined direction when said first binary control signal is in a second binary state; and

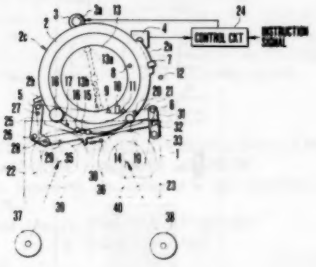
(e) means for moving said magnetic head in a radial direction in accordance with said second binary control signal.

4,686,591

TAPE LOADING DEVICE FOR A RECORDING AND/OR REPRODUCING APPARATUS

Junji Kobayashi, Tokyo, and Hisashi Nakano, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1984, Ser. No. 686,650
Claims priority, application Japan, Dec. 27, 1983, 58-251399; Dec. 27, 1983, 58-251400; Jan. 23, 1984, 59-010651
Int. Cl.[4] G11B *15/00, 15/665*
U.S. Cl. 360—85 **4 Claims**



1. A recording and/or reproducing apparatus using an extractable tape shaped record bearing medium housed in a container having wind-up means for winding up the medium, said apparatus comprising:

(A) signal recording and/or reproducing means for recording signals on and/or reproducing recorded signals from the medium;

(B) loading means for loading said recording and/or reproducing means with the medium, said loading means being movable between a loading position in which a portion of the medium is outside the container and an unloading position;

(C) guide means for guiding the medium at the outside of the container, said guide means being movable between a predetermined effective guiding position outside of the container and a predetermined ineffective guiding position inside of the container in response to the movement of said loading means between said loading position and said unloading position;

(D) first drive means for moving said loading means between said loading position and said unloading position;

(E) second drive means for causing the wind-up means to wind up the medium; and

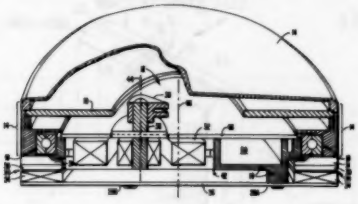
(F) control means for changing a moving speed of said loading means in response to the movement of the loading means.

4,686,592

DISK DRIVE ASSEMBLY

Thomas D. Carroll, and Clifford B. Akers, both of 1475 S. Bascom Ave., Suite 201, Campbell, Calif. 95008

Filed May 2, 1985, Ser. No. 730,664
Int. Cl.[4] G11B 5/012, 5/82
U.S. Cl. 360—97 25 Claims



1. An improved magnetic disk recording apparatus of the type including a disk having at least one recording surface and an aperture centered with respect to the center line of the disk, transducer means for sensing the recording surface, a housing, and a base wherein the disk is secured about its periphery to the periphery of the housing, the improvement comprising:

bearing means for supporting the housing for rotation, wherein the bearing means are positioned on the base so as to make contact with the housing at the periphery of the housing;

means for urging the housing to rotate relative to the base; and

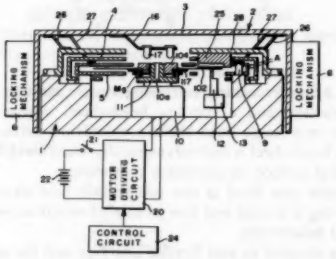
means coupled to the transducer means through the aperture and supported on the base inwardly from the bearing means for moving the transducer means relative to the surface of the disk.

4,686,593

OVERRIDING LOADING DOOR FOR A MAGNETIC RECORDING/REPRODUCING APPARATUS

Yoshiyuki Watanabe, and Yukio Shibata, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 28, 1985, Ser. No. 707,495
Claims priority, application Japan, Feb. 28, 1984, 59-36953; Feb. 28, 1984, 59-36954
Int. Cl.[4] G11B 17/04
U.S. Cl. 360—97 6 Claims



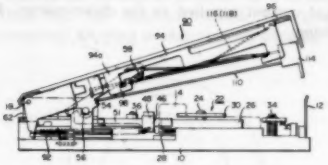
1. A magnetic recording/reproducing apparatus having a door capable of opening and closing for loading and unloading a pack that contains a magnetic sheet with a center core, the door when closed having a locked position, means mounting said door for overriding movement beyond said locked position and for return movement thereafter back to said locked position, a pressure member inside said door for pressing said center core of said magnetic sheet on a driving spindle of said apparatus upon said overriding movement of said door; and mechanical means for locking said door in said locked position, said mechanical lock means being adapted to be actuated by said return movement of said door so as to lock said door in a position in which said pressure member is spaced from said center core.

4,686,594

CARTRIDGE TYPE FLOPPY DISK DRIVE

Hiroshi Kurafuji, Tokyo, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Jul. 5, 1984, Ser. No. 627,882
Claims priority, application Japan, Jul. 4, 1983, 58-103726; Aug. 23, 1983, 58-153389; Sep. 6, 1983, 58-163787; Sep. 6, 1983, 58-138192
Int. Cl.[4] G11B 17/04
U.S. Cl. 360—99 1 Claim



1. A floppy disk drive comprising a frame portion including a spindle motor for directly driving a floppy disk, a plurality of pins for positioning a disk cartridge relative to said spindle motor and at least one head means for contacting said disk to READ/WRITE information thereon, a carriage for supporting and moving said head means to a desired track on said disk, and a carrier pivotally mounted on said frame portion and for containing said disk cartridge therein, said carrier including a cartridge guide loosely pivotally mounted on and parallely movable relative to said carrier, said cartridge guide for receiving said disk cartridge, a first spring means for biasing said cartridge guide in a direction perpendicular to said carrier when said carrier is in a pop-up position and a second spring means for biasing said carrier towards said popped-up position, whereby said disk cartridge can be inserted into said cartridge guide when said cartridge guide is opened relative to said carrier at said pop-up position of said carrier, and said cartridge guide can be moved pivotally relative to said carrier and moved to a predetermined position parallel to said carrier while holding said disk cartridge when said carrier is engaged by said frame portion, said floppy disk drive further characterized by means for causing said carrier to pop-up at a predetermined first angle and for causing said cartridge guide to pop-up at a predetermined second angle which is smaller than said first angle relative to said frame whereby the cartridge is ejected after said carrier pops-up at said first angle.

4,686,595

APPARATUS FOR REPOSITIONING A TRANSDUCER IN THE ABSENCE OF ELECTRICAL CURRENT TO A DRIVE SYSTEM

Philip Bryer, Canoga Park, Calif., assignor to Xebec Development Partners, Ltd., San Jose, Calif.

Filed Oct. 17, 1985, Ser. No. 788,456
Int. Cl.[4] G11B 5/55, 21/08, 5/54, 21/22
U.S. Cl. 360—106 4 Claims

1. In a drive system for an information storage disk supported on a turntable in which a movable transducer member is mounted on an arm driven by a drive shaft rotatable about an axis of rotation to read information from the face of the disk, a mechanism for repositioning the transducer member in the absence of electrical current to the drive system comprising:

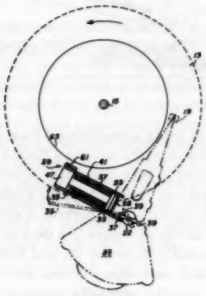
a solenoid capable of being energized by the electrical current supplied to the drive system, said solenoid being in spaced relationship with said turntable;

a first lever arm rotatable about a first fulcrum positioned in a plane lying between said drive shaft and said solenoid, said first lever arm including a ferromagnetic material at one end thereof, said ferromagnetic material being attracted to the solenoid when the solenoid is energized by the electrical current supplied to the drive system;

a spring in communication with the first lever arm, said spring biasing the first lever arm to rotate about said first fulcrum away from the solenoid when the solenoid is not energized by the electrical current supplied to the drive system;

means for transferring rotational motion of the first lever arm about said first fulcrum to the drive shaft to thereby rotate the drive shaft,

whereby the transducer member mounted on the arm driven by the drive shaft will be repositioned to a predetermined reference position relative to the disk in the absence of electrical current supplied to the drive system, further comprising:



a second layer arm rotatable about a second fulcrum positioned in a plane lying between said drive shaft and said solenoid, said second lever arm including a ferromagnetic material at one end thereof, said ferromagnetic material being attracted to the solenoid when the solenoid is energized by the electrical current supplied to the drive system;

brake pad means mounted to the end of said second lever arm having said ferromagnetic material;

said spring being in communication with the second lever arm, said spring biasing the second lever arm to rotate about said second fulcrum away from the solenoid and toward the turntable when the solenoid is not energized by the electrical current supplied to the drive system;

whereby said brake pad means is brought into frictional contact with the turntable in the absence of electrical power to the drive system to thereby apply braking action to the turntable.

4,686,596

RECORDING HEAD CORE YOKE AND METHOD OF MANUFACTURE

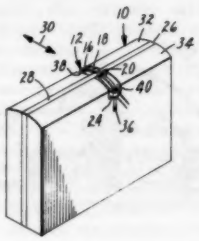
John C. Kraemer, Oakdale, Minn., and Paul R. Iverson, St. Croix Falls, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 27, 1985, Ser. No. 749,938
Int. Cl.[4] G11B *5/16, 5/22*
U.S. Cl. 360—126 **6 Claims**

1. A yoke for supporting in proximity to a moving recording medium at least one video recording core including a flat, generally rectangular body having two major surfaces, two ends, a curved edge, a second edge opposite said curved edge and two wound-wire coils adjacent said ends which extend beyond said major surfaces, said yoke comprising a generally rectangular block having:

an edge defining a bearing surface for supporting a said recording medium transversely of medium movement;

a thin slot disposed perpendicularly to said bearing surface for receiving a said video recording core and stabilizing a said core along substantially its entire length from said curved edge to said second edge; and



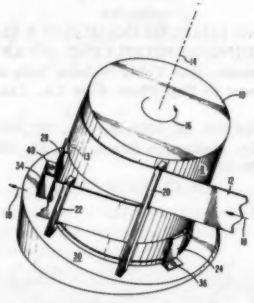
two relief pockets each extending from each of said major surfaces of said block less than one-half the dimension of said block between said major surfaces and open at said bearing surface adjacent said slot for receiving said coils associated with a said recording core.

4,686,597

ROTATING HEAD APPARATUS INCLUDING A FLYING TAPE EDGE GUIDE

Ross W. Johnston, Norristown, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Sep. 27, 1985, Ser. No. 780,901
Int. Cl.[4] G11B *15/60*
U.S. Cl. 360—130.23 **20 Claims**



1. In a tape recording/retrieving system including a fixed base structure and a rotating headwheel, wherein a tape wrapped in a single helix about a cylindrical surface of said rotating headwheel is hydrodynamically lifted away from said cylindrical surface, an apparatus comprising:

a flexible arm fixed at one end to said base structure and having a second end free to move toward or away from said headwheel;

means coupled to said flexible arm free end for supporting said tape, said supporting means having a support surface adapted to support said tape; and

deflection means coupled to said flexible arm and having an inner surface in close facing relation to said cylindrical surface, said deflection means being responsive to the hydrodynamic force between said inner surface and said headwheel generated by the rotation of said headwheel, for deflecting said free end of said flexible arm, thereby displacing said support surface of said supporting means away from said rotating cylindrical surface.

4,686,598

SAFETY CIRCUIT FOR VEHICLE ELECTROMOTIVE WINDOW LIFTS

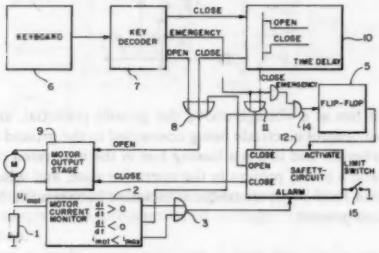
Klaus-Dieter Herr, Edingen, Fed. Rep. of Germany, assignor to Helmut Hund K.G., Wetzlar-Nauborn, Fed. Rep. of Germany

Filed Dec. 3, 1984, Ser. No. 677,475

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1983, 3346366

Int. Cl.[4] H02P 1/22

U.S. Cl. 361—31 **3 Claims**



1. In a safety circuit having therein a drive motor and means reversing the direction of rotation of said drive motor when there is a sudden increase in the motor current, said drive motor actuating a window lift and a window attached to said lift, the improvement comprising:

means rotating said drive motor through a predetermined period of time in a window-open direction upon actuation of a window-close switch and generation of a start-up current, thereby displacing said window through a predetermined distance in said window-open direction;

means reversing the direction of rotation of said drive motor at the end of said predetermined period of time, thereby displacing said window in a window-close direction;

means adjusting said predetermined period of time through which said drive motor rotates first in said window-open direction and thereafter in said window-close direction to such a length that the motor current has already assumed its normal value when the window has again reached a starting position; and

means disconnecting said means rotating after switching the motor operation at the beginning of the movement of said window in said window-close direction.

4,686,599

MOTOR PROTECTION SWITCH

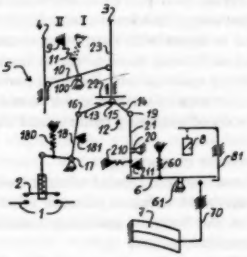
Peter Hilfiker, Buchs, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed Nov. 20, 1985, Ser. No. 799,934

Claims priority, application Switzerland, Dec. 6, 1984, 5796/84

Int. Cl.[4] H02H 5/04

U.S. Cl. 361—32 **7 Claims**



1. Motor protection switch with a housing and at least one contact piece which is movable relative to at least one resting contact piece, the movable contact piece being movable against the urge of a spring into an "on" position and back into an "off" position by way of a manually operated actuating means and through linkage means, and wherein said linkage means are locked by a pawl in the "on" position in such a way that the linkage means can be released either by an overload current trigger or by a short circuit trigger, and wherein retracting or pullback means are provided for said actuating means, characterized in that said retracting or pullback means provided for said actuating means comprise two settings being settable from outside, whereby in the first setting said retracting or pullback means are positioned to yieldingly urge said actuating means into a trip position arranged between said "on" position and said "off" position upon overload current tripping or short circuit tripping and whereby the second setting is positioned to induce the direct travel of said actuating means from said "on" position to said "off" position upon current overload tripping or short circuit tripping.

4,686,600

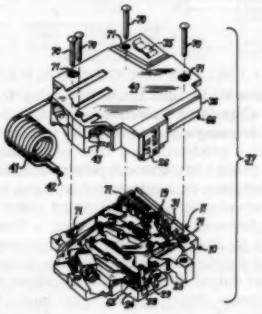
MODULAR GROUND FAULT CIRCUIT BREAKER

Robert A. Morris, Burlington, and Paul T. Rajotte, Plainville, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Apr. 22, 1985, Ser. No. 725,730

Int. Cl.[4] H02H 3/16

U.S. Cl. 361—42 **12 Claims**



1. A ground fault circuit breaker module comprising:

a molded plastic case;

a pair of separable contacts within said case connected in series with thermal and magnetic trip means between a load and line terminal for automatic separation by means of an operating mechanism upon predetermined overcurrent through said contacts;

a handle operator for opening and closing said separable contact independent of said operating mechanism;

an extension on said plastic case having first slot means formed therein for receiving a portion of a ground fault circuit test button and second slot means formed within said extension for receiving a portion of a test spring anchor; and

a test spring within said extension for operatively providing bias to said test button when depressed to a test position for returning said test button to an initial rest position, said test spring comprising a flat strip end and an S-shaped end.

4,686,601

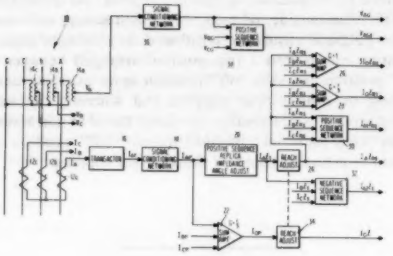
GROUND DISTANCE RELAY FOR AC POWER TRANSMISSION LINE PROTECTION

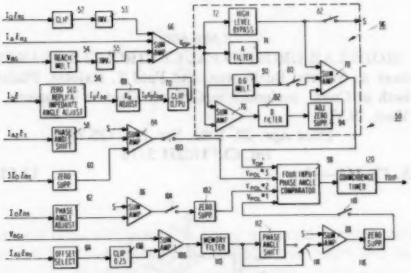
George E. Alexander, Wallingford, and Stanley B. Wilkinson, Havertown, both of Pa., assignors to General Electric Company, King of Prussia, Pa.

Filed Oct. 2, 1985, Ser. No. 782,833

Int. Cl.[4] H02H *3/26*

U.S. Cl. 361—80 **13 Claims**





6. In a ground distance protective relay for protecting a three-phase alternating current power transmission line by generating a tripping signal in response to a fault on any phase of the line in a predetermined zone of protection, the relay being of the phase comparator type and including: phase coincidence detection means responsive to input signals supplied thereto for developing an output signal when there is phase coincidence between said input signals, a first of said input signals being an operating signal and a second of said input signals being a polarizing signal, and timer circuit means for developing an output responsive to the output signal from said phase coincidence detecting means continuing for a predetermined duration, the improvement comprising:

(a) means for deriving said first input signal from component signals that are summed together;

(b) means for deriving said second input signal from component signals that are summed together; and

(c) clipping means for limiting to a predetermined maximum value at least one of said component signals.

4,686,602

PROTECTIVE CIRCUIT ARRANGEMENT FOR PROTECTING SEMICONDUCTOR COMPONENTS

Walter Bucksch, Freising, Fed. Rep. of Germany, assignor to Texas Instruments Incorporated, Dallas, Tex.

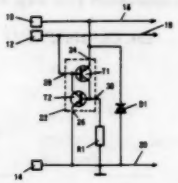
Filed May 28, 1985, Ser. No. 737,962

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1984, 3422132

Int. Cl.[4] H02H *9/04*

U.S. Cl. 361—91 **3 Claims**

1. Protective circuit arrangement including a bipolar integrated circuit which has at least one supply voltage terminal, an input or output terminal, and a ground terminal, comprising between the ground terminal and the input or output terminal a thyristor-tetrode having a first control electrode and a second control electrode, the first control electrode being connected to a line which in the operative state of the integrated



circuit lies at a voltage above the ground potential, and the second control electrode being connected to the ground terminal, wherein said line is a biasing line in the integrated circuit, whereon a bias is present in the operative state, and wherein a junction field-effect transistor is included between the biasing line and ground.

4,686,603

OVERVOLTAGE ARRESTER

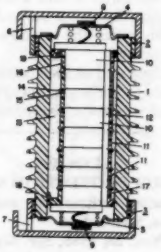
Joseph Mosele, Biberist, Switzerland, assignor to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Jan. 9, 1986, Ser. No. 817,445

Claims priority, application Switzerland, Feb. 26, 1985, 862/85

Int. Cl.[4] H02H *9/04*

U.S. Cl. 361—118 **14 Claims**



1. In an overvoltage arrester including a housing formed of insulating material, two power connections mounted in the housing, at least one cylindrical varistor located in the housing and connected in series with the power connections by electrodes located at the end faces of the at least one varistor, a body of insulating material which at least partially embeds the at least one varistor on its surface, and an annular space located between the body of insulating material and an interior wall of the housing,

the improvement comprising:

the at least one varistor located relative to the body of insulating material to define a pressure relief duct extending interior of the body of insulating material between the power connections, and

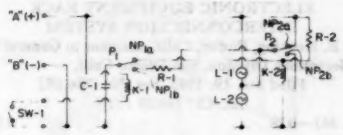
an electrically-insulating, heat-conducting material means filling the annular space.

4,686,604

BISTABLE RELAY CIRCUIT

Bernard S. Gilman, 484 Laurel Rd., Rockville Center, N.Y. 11570

Filed May 27, 1986, Ser. No. 866,700
Int. Cl.[4] H01H 47/00, 47/32, 47/14
U.S. Cl. 361—155 4 Claims



1. A bistable relay circuit adapted to be operated from a two polarity supply of a predetermined voltage, comprising in combination,

a control relay having a coil, and at least first single pole, double throw switch means, having one pole contact and two non-pole contacts,

a first resistor in series with said coil of said control relay, the series combination of said control relay coil and of said first resistor being connectable to said power supply,

said control relay coil having a resistance value which is low compared to the resistance value of said first resistor, while a current operatively flowing therethrough is insufficient on its own to energize said control relay,

a steering relay having a coil and at least second single pole, double throw switch means, having one pole contact and two non-pole contacts,

single pole, single throw switch means in series with the coil of said steering relay, the series combination of said steering relay coil and said single pole, single throw switch means being connectable to said power supply, and

a capacitor connected to the pole of said second switch means and to one polarity of said power supply, whereby

(a) upon connection of said circuit to said power supply, and upon said single pole, single throw switch means being initially in an open position, said control relay is in a non-energized state,

(b) upon said single throw switch means being subsequently closed, said steering relay changes to an energized state, said capacitor being thereby charged to said voltage, while said control relay remains in said non-energized state,

(c) upon said single throw switch means being subsequently opened, said steering relay coil is de-energized, said capacitor discharges at least partly through said second switch means and said coil of said control relay to change said control relay to an energized state, and said control relay remains in said energized state by said current continuing to flow therethrough,

(d) upon said single throw switch means being thereafter reclosed, said coil of said steering relay is re-energized, and any residual charge on said capacitor is further discharged through said first switch means, while

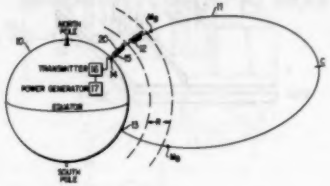
(e) upon said single throw switch means being subsequently re-opened, said steering relay is de-energized, while said capacitor is recharged through said second switch means by a recharging current surge, said recharging current surge being selected to be sufficient to cause a momentary voltage drop of sufficient magnitude through said first resistor to cause said control relay to revert to said non-energized state.

4,686,605

METHOD AND APPARATUS FOR ALTERING A REGION IN THE EARTH'S ATMOSPHERE, IONOSPHERE, AND/OR MAGNETOSPHERE

Bernard J. Eastlund, Spring, Tex., assignor to APTI, Inc., Los Angeles, Calif.

Filed Jan. 10, 1985, Ser. No. 690,333
Int. Cl.[4] H05B 6/64; H05C 3/00; H05H 1/46
U.S. Cl. 361—231 15 Claims



1. A method for altering at least one region normally existing above the earth's surface with electromagnetic radiation using naturally-occurring and diverging magnetic field lines of the earth comprising transmitting first electromagnetic radiation at a frequency between 20 and 7200 kHz from the earth's surface, said transmitting being conducted essentially at the outset of transmission substantially parallel to and along at least one of said field lines, adjusting the frequency of said first radiation to a value which will excite electron cyclotron resonance at an initial elevation at least 50 km above the earth's surface, whereby in the region in which said electron cyclotron resonance takes place heating, further ionization, and movement of both charged and neutral particles is effected, said cyclotron resonance excitation of said region is continued until the electron concentration of said region reaches a value of at least 10^6 per cubic centimeter and has an ion energy of at least 2 ev.

4,686,606

DEVICE FOR COOLING INTEGRATED CIRCUIT CHIP

Minoru Yamada, Irums; Mitsuru Usui, Yokohama; Akira Masaki, Tokyo; Keiichirou Nakanishi, Kokubunji, and Masahide Tokuda, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 10, 1986, Ser. No. 827,613
Claims priority, application Japan, Mar. 4, 1985, 60-41118
Int. Cl.[4] H05K 7/20
U.S. Cl. 361—385 20 Claims

1. An integrated circuit chip cooling device comprising:

a wiring substrate means for mounting a plurality of integrated circuit chips thereon;

a plurality of cooling blocks associated with respective integrated circuit chips, each of said cooling blocks having an internal space through which a coolant flows;

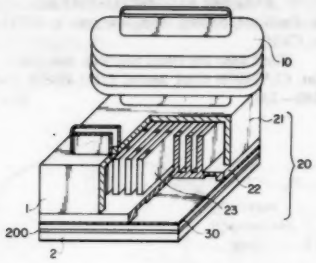
means associated with the respective integrated circuit chips and said cooling blocks, each of said suction means including a suction plate having a surface formed with grooves disposed in opposition to the respective integrated circuit chips and a liquid interposed between said grooved surface and said associated integrated circuit chip, whereby said integrated circuit chip is sucked by said liquid to said surface formed with said groove;

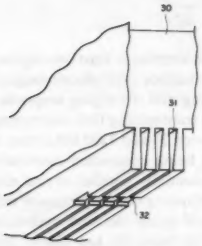
thermal conductivity means corresponding to said integrated circuit chips, each of said thermal conductivity means being interposed between said suction plate and said cooling block to connect said suction plate with said cooling block and absorb a deflection of said suction plate;

resilient pipe means connected with said cooling blocks for supplying coolant to said cooling blocks and being adapted to expand and contract in a direction orthogonal with respect to said wiring substrate; and

a hat disposed in opposition to said wiring substrate and

having an internal coolant passage for introducing said coolant into said resilient pipe means, said hat being





bonded to marginal edges of said wiring substrate to hermetically seal said plural integrated circuit chips.

4,686,607

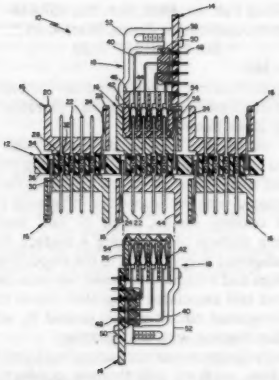
DAUGHTER BOARD/BACKPLANE ASSEMBLY

Lennart B. Johnson, Milford, N.H., assignor to Teradyne, Inc., Boston, Mass.

Filed Jan. 8, 1986, Ser. No. 817,013

Int. Cl.[4] H01R *23/68*

U.S. Cl. 361—413 **7 Claims**



1. A daughter board/backplane assembly comprising

a backplane having first and second surfaces and holes extending from said first surface to said second surface,

pairs of separate first contacts having first ends mounted in said holes and second ends extending from opposite ends of said holes, each said contact of a pair extending from opposite ends of the same hole, each said second end being positioned with respect to the respective surface from which it extends, and

a plurality of daughter boards mounted on opposite sides of said backplane and carrying second contacts mating with said second ends of said first contacts extending from both said first and second surfaces.

4,686,608

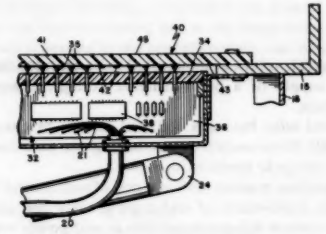
ELECTRONIC EQUIPMENT RACK INTERCONNECTION SYSTEM

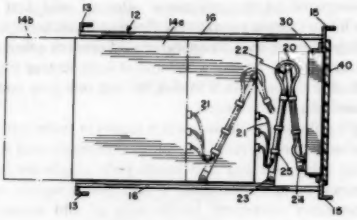
Michael B. Hosking, Poway, Calif., assignor to General Dynamics, Electronics Division, San Diego, Calif.

Filed Jul. 19, 1985, Ser. No. 756,682

Int. Cl.[4] H02B *1/10*

U.S. Cl. 361—428 **13 Claims**





1. An interconnection system for electrical interconnection of a plurality of electronic equipment units slideably mounted in spaced parallel relationship on an electronic equipment rack, the system comprising:

a backplane for attachment to an electronic equipment rack frame, the frame comprising support means for releasably supporting a plurality of electronic equipment units in spaced parallel support planes, the backplane comprising a substantially rigid panel for mounting across one wall of the frame and a plurality of spaced conductors extending across the panel in a first direction transverse to said electronic equipment unit support planes for providing electrical signal paths between selected units; and

a plurality of connector assemblies for providing signal communication between each electronic equipment unit and selected ones of the backplane conductors; each connector assembly comprising a mating connector device for mounting adjacent said backplane in alignment with a respective one of said electronic equipment units to extend transverse to said first direction across said backplane conductors, first connector means for electrically connecting said mating conductor device to preselected ones of said backplane conductors, and second connector means for electrically connecting said respective electronic equipment unit and said mating connector device;

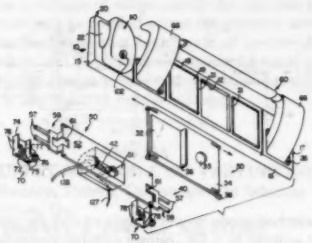
said mating connector device comprising selected interface circuitry for connection between said electronic equipment unit and selected backplane conductors.

4,686,609

VEHICLE INTERIOR LIGHT

Ronald A. Dykstra, Rockford; Mark W. Hawks, and Jerry M. De Jong, both of Holland, all of Mich., assignors to Prince Corporation, Holland, Mich.

Filed Jan. 13, 1986, Ser. No. 818,335
Int. Cl.[4] B60Q *1/00, 3/00*
U.S. Cl. 362—61 20 Claims



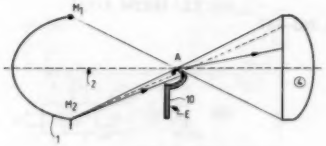
1. An interior light for a vehicle comprising:
a lamp housing for attachment to a vehicle;
lamp means positioned within said housing;
a cover panel coupled to said housing, said housing and panel cooperatively defining a guide track therebetween which extends in alignment with said lamp means;
a light control panel slidably mounted within said guide track, said light control panel including at least a pair of spaced sections which can be selectively aligned with said lamp means with each of said sections including means for uniquely controlling light from said lamp to provide a selectable lighting effect by movement of said light control panel; and
a generally U-shaped assist handle and means for pivotally mounting said handle to said cover panel.

4,686,610

MOTOR VEHICLE HEADLAMPS PROJECTING A MASKED BEAM, IN PARTICULAR A DIPPED BEAM

Pierre Cibié, and Norbert Brun, both of Bobigny, France, assignors to Cibie Projecteurs, France

Filed Jun. 27, 1985, Ser. No. 749,571
Claims priority, application France, Jun. 27, 1984, 84 10150
Int. Cl.[4] F21V *11/00*
U.S. Cl. 362—61 12 Claims



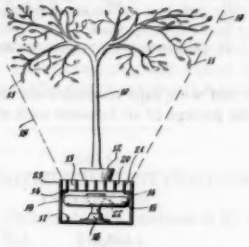
1. A masked beam motor vehicle headlamp comprising, in succession: a reflector; a light source; a masking screen having a cutoff edge; and a converging lens; wherein the screen is provided beneath the cutoff edge with an opening which extends at least over a central portion of the screen and which is suitable for allowing a portion of a light flux directed toward the screen to pass therethrough; and wherein means are provided to direct a flux passing through said opening to be combined with the flux which is not intercepted by the screen thereby improving the light distribution characteristics of the masked beam as finally projected by the headlamp.

4,686,611

APPARATUS FOR ILLUMINATING CENTRIPETALLY VIEWED THREE-DIMENSIONAL OBJECTS

Henry Von Kohorn, 215 Rocky Rapids Rd., Stamford, Conn. 06903

Continuation-in-part of Ser. No. 697,168, Feb. 1, 1985, Pat. No. 4,626,968, which is a continuation-in-part of Ser. No. 660,905, Oct. 15, 1984, Pat. No. 4,594,646, and a continuation-in-part of Ser. No. 733,936, May 14, 1985, Pat. No. 4,616,304. This application Jul. 24, 1986, Ser. No. 889,818
Int. Cl.[4] F21P *1/02*
U.S. Cl. 362—123 29 Claims



1. An illuminating apparatus for illuminating a three-dimensional object for substantially glare-free centripetal viewing by observers encircling said object, comprising:
means for supporting said object to be illuminated, said object being disposed essentially above said illuminating apparatus,
a grille extending horizontally around a lower portion of said object having spaced vertically extending walls forming a plurality of compartments for permitting vertical passage of light and preventing radial escape of light,
an electric light source mounted below and proximate to said grille,
an upwardly reflective surface disposed below said light source,
a light chamber enclosing said light source and said reflective surface having walls adapted to prevent light from escaping except in an upward direction through said compartments in a direction of said object in the form of an upwardly spreading light cone penetrating an underside and enveloping outer reaches of said object, and
said vertically extending walls of said compartment being sufficiently high in relation to their plan view cross section so that said light is substantially not directly visible to observers encircling said object and is indirectly visible to such observers by the reflections of the light from surfaces of said object.

4,686,612

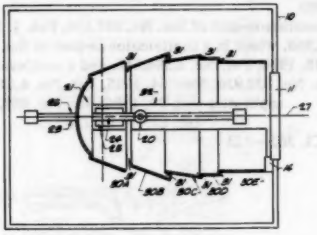
LAMP REFLECTOR ASSEMBLY

David A. Pringle, Pacific Palisades, and Helen Gourley, San Francisco, both of Calif., assignors to Optech Inc., Burbank, Calif.

Filed Oct. 25, 1985, Ser. No. 791,214
Int. Cl.[4] F21V *7/04*
U.S. Cl. 362—297 18 Claims

1. A reflector assembly for projecting a beam of light along an optical axis, said assembly comprising:
(a) an enclosure having an aperture for projecting said beam of light;
(b) a source of light mounted within said enclosure;
(c) a reflecting mirror disposed within said enclosure, arranged to move axially with respect to the optical axis of the beam of light between positions adjacent said aperture and remote from said aperture, and disposed to reflect light source through said aperture; and
(d) a plurality of reflector segments disposed between said

movable reflector and the aperture in said enclosure, said segments each being defined as a portion of a cone or



cylinder and with gaps therebetween arranged so as to permit the passage of air between such segments.

4,686,613

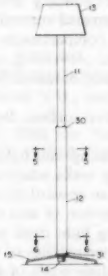
NON-ROTATABLE TELESCOPING ASSEMBLY

William J. Payne, Greensburg, Pa., assignor to Crown Creative Industries, Greensburg, Pa.

Filed May 2, 1984, Ser. No. 606,356

Int. Cl.[4] F21S *3/12*

U.S. Cl. 362—413 **6 Claims**



1. An essentially non-rotatable telescoping support structure adapted to be used in combination with an electric lamp, comprising:

a. an outer stationary cylindrical tubular member having two ends of constant radial cross sectional areas and an elliptical shaped cross sectional area between said ends, said outer member housing a lamp base mounted at one end thereof; and

b. an inner slidable cylindrical tubular member contained within said outer member and having two ends with an electric lamp being mounted on one of said ends, said inner member having a constant radial cross sectional area throughout its length except for the other of said ends which has an oval shaped cross sectional area which is smaller than said elliptical area, said inner member being freely slidable within and along said outer member, said elliptical and oval areas are aligned so as to permit relative movement between said members, and said inner member and said outer member being placed in a locked relationship when said elliptical and oval areas are aligned so as to create sufficient contact between said members to prevent movement whereby a desired stable length of said structure may be obtained.

4,686,614

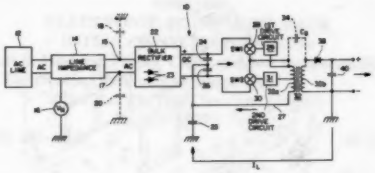
REDUCED EMI NOISE IN SWITCHED-MODE POWER SUPPLY

Louis B. Costelio, Niles, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Apr. 15, 1986, Ser. No. 852,064

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—17 **5 Claims**



1. A switched-mode power supply circuit for converting an AC input voltage to a DC output voltage comprising:

a pair of input terminals coupled to a source of the AC input voltage;

rectifying means coupled to said pair of input terminals for generating DC drive signals;

high frequency switching means coupled to said rectifying means for converting said DC drive signals to a plused DC voltage;

a switching transformer coupled to said high frequency switching means and responsive to said pulsed DC voltage for generating said DC output voltage, wherein said switching transformer includes a high frequency leakage current;

grounded capacitive conducting means coupled between said rectifying means and said switching means for providing a low impedance return path directly to said high frequency switching means for said high frequency leakage current; and

a feedback control loop coupled to said switching transformer and between said rectifying means and said switching means, wherein said grounded capacitive means is coupled to said feed back control loop.

4,686,615

POWER SUPPLY CIRCUIT

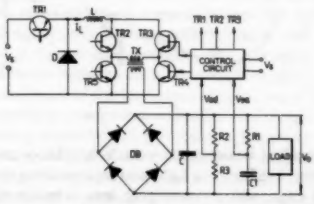
Michael J. Ferguson, Edinburgh, Scotland, assignor to Ferranti, plc, Cheshire, England

Filed Aug. 13, 1986, Ser. No. 895,918

Claims priority, application United Kingdom, Aug. 23, 1985, 8521183

Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—17 **2 Claims**



1. A direct-current power supply circuit which includes a series-connected switch and an inductor connected together with a flywheel diode across an input voltage supply, a transformer having a primary winding connected to the inductor and the diode by way of a bridge-connected network of switching devices, a reservoir capacitor connected to a secondary winding of the transformer by way of a full-wave rectifier and arranged for connection to a load, and control

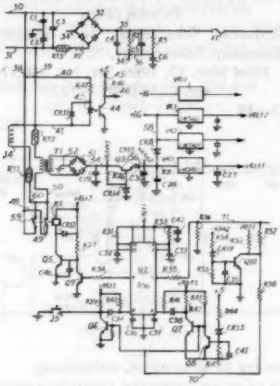
means comprising first circuit means operable to produce a triangular voltage waveform having positive and negative gradients proportional to the value of the supply voltage, and second circuit means responsive to the alternating-current and direct-current components of the output voltage applied to the load to produce a reference error voltage, the series-connected switch being closed when the triangular voltage exceeds the reference error voltage and being opened when the triangular voltage is below the reference error voltage, the arrangement being such that a voltage of either one or the opposite polarity or a short-circuit may be applied across the primary winding of the transformer and such that each cycle of operation of the switching devices and of the series-connected switch transfers an equal amount of charge to the reservoir capacitor regardless of variations in the input or output voltage.

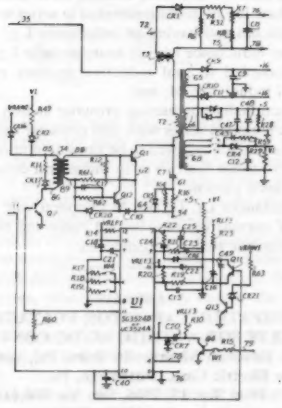
4,686,616

POWER SUPPLY OPERABLE ON VARYING INPUTS

Floyd L. Williamson, Duluth, Ga., assignor to Intecolor Corporation, Norcross, Ga.

Filed Oct. 3, 1986, Ser. No. 914,815
Int. Cl.[4] H02M *3/335*
U.S. Cl. 363—21 **8 Claims**





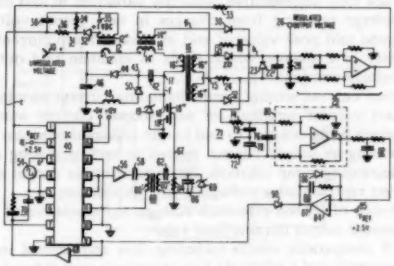
1. A power supply for producing at least one stable DC voltage from an AC line voltage, said power supply including rectifying means connected to said line voltage for producing a DC voltage proportional to said line voltage, a first transformer, switching means for selectively connecting said first transformer across said DC voltage, said first transformer having a primary winding and at least one secondary winding, said secondary winding including rectifying means for preventing current flow in said secondary winding while said primary winding is connected to said DC voltage by said switching means, control means for controlling said switching means for varying the length of time said primary winding of said first transformer is connected across said DC voltage, and a start-up means for said power supply, said start-up means including a second transformer having a primary winding connected across said line voltage and a secondary winding for producing a voltage proportional to said line voltage, circuit means for providing said voltage proportional to said line voltage to said control means for controlling said switching means, and means for disconnecting said second transformer from said line voltage after said power supply is producing said stable DC voltage.

4,686,617

CURRENT LIMITED CONSTANT FREQUENCY DC CONVERTER

Robert M. Colton, Philadelphia, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Jun. 6, 1986, Ser. No. 871,372
Int. Cl.[4] H02H *7/122*; H02M *3/335*
U.S. Cl. 363—56 **12 Claims**



1. A current limited constant-frequency current-programmed voltage regulator, comprising:

inductance means;

controllable switch means coupled with said inductance means to form a switchable circuit, said switchable circuit being adapted for connection to a source of unregulated voltage for generating an increasing ramp current through said inductance means during those intervals during which said switch means is conductive and a decreasing ramp current through said inductance means during those intervals during which said switch means is nonconductive;

output capacitance means coupled to said switchasble circuit for being charged by at least one of said increasing and decreasing ramp currents to produce a direct output voltage adapted to be applied to utilization means;

controllable bistable means coupled to said switch means for assuming one of first and second states for controlling the conductive state of said switch means, said first state corresponding to a conductive state of said switch means, and said second state corresponding to a nonconductive state of said switch means;

clock means coupled to said bistable means for recurrently generating clock signal for recurrently triggering said bistable means into said first state, whereby said increasing ramp current recurrently flows through said inductance means;

first current sensing means coupled to said switchable circuit

for producing an increasing ramp voltage which is representative of said increasing ramp current and for producing a decreasing ramp voltage representative of said decreasing ramp current;

first comparator means including first and second input terminals, said first input terminal of said first comparator means being coupled to said first current sensing means, said first comparator means also including an output terminal coupled to said bistable means, for comparing said increasing ramp voltage with an error voltage applied to said second input terminal of said first comparator means for generating a switching signal for switching said bistable means to said second state when said increasing ramp voltage equals said error voltage, whereby said increasing ramp current ceases at its peak value and said decreasing ramp current flows through said inductance means until the next recurrence of said clock signal;

a source of first reference voltage;

second comparator means including first and second input terminals and a relatively high impedance output terminal at which said error voltage is generated, said first input terminal of said second comparator means being coupled to said output capacitance means for sensing said output voltage, said second input terminal of said second comparator means being coupled to said source of first reference voltage, and said relatively high impedance output terminal being coupled to said second input terminal of said first comparator means to close a voltage control feedback loop, said second comparator means comparing said output voltage with said first reference voltage for generating said error voltage in a polarity such as to make said feedback loop degenerative, whereby variations in said error voltage resulting from changes in said output voltage cause said peak value of said increasing ramp current to vary in a manner which tends to maintain said output voltage constant;

second current sensing means including current terminals, said current terminals of said second current sensing means being coupled to said output capacitance means for sensing an output current related to said increasing and decreasing ramp currents, for generating an output current representative voltage at low impedance;

a source of second reference voltage representative of the desired output current limit value;

third comparator means including first and second input terminals and a relatively low impedance output terminal, said first input terminal of said third comparator means being coupled to said second current sensing means for receiving said output current representative voltage therefrom, and said second input terminal of said third comparator means being coupled to said source of second reference voltage, for comparing said output current representative voltage with said second reference voltage for generating a substantially bilevel current limit control voltage at said output terminal of said third comparator means, said bilevel current limit control voltage making a transition when said output current representative voltage exceeds said second reference voltage;

first unidirectional current conducting means coupled to said first input terminal of said third comparator means and to said relatively low impedance output terminal of said third comparator means for limiting the excursion in that polarity of said bilevel current limit control voltage occurring when said output current is less than said desired output current limit value, whereby said third comparator means is held out of saturation during normal operation;

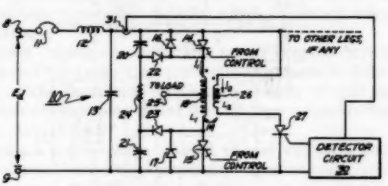
second unidirectional current conducting means coupled to said relatively high impedance outut terminal of said second comparator means and to said relatively low impedance output terminal of said third comparator means for closing an output current limiting degenerative feedback loop for overriding said error voltage at said relatively high impedance output terminal of said second comparator means with the signal from said relatively low impedance output terminal of said third comparator means thereby reducing said error voltage when said output current reaches said desired outut current limit value, whereby said peak value of said increasing ramp current is reduced when said output current reaches said current limit value thereby limiting said output current in the region of said output current limit value, and whereby a failure of said third comparator means which increases its output impedance does not necesarily result in total failure to limit current because said first and second unidirectional current conducting means are rendered conductive at an output current somewhat exceeding said desired output current limit value to couple said relatively high impedance output terminal of said second comparator means with said relatively low impedance of said second current sensing means whereby said error voltage produced by said relatively high impedance output terminal of said second comparator means is overridden and reduced by said output current representative voltage from said relatively lower impedance of said second current sensing means.

4,686,618

FAULT PROTECTION FOR GTO VOLTAGE-SOURCE INVERTERS

William McMurray, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 17, 1986, Ser. No. 840,176
Int. Cl.[4] H02H 7/122
U.S. Cl. 363—58 **19 Claims**



1. A phase leg of an inverter, comprising:

a plurality of series-connected controlled turn-off phase leg switches for coupling to a dc power supply in a series aiding direction and providing an ac output;

inductive snubber means for limiting di/dt during turn-on of said phase leg switches connected in series with said phase leg switches and having an inductance L_1;

a crowbar inductance having an inductance L_2 and magnetically coupled to said inductive snubber means with a mutual inductance M; and

a unidirectionally-conducting crowbar switch connected in said direction in series with said crowbar inductance, said crowbar switch adapted to be turned on upon the onset of an overcurrent fault so as to thereupon conduct crowbar inductance current;

said inductances L_1, L_2 and M cooperatively reducing the rate of current increase in said phase leg switches when said crowbar switch is turned on.

4,686,619

LOW DISSIPATION CAPACITOR VOLTAGE SHARING CIRCUIT FOR A STATIC AC/DC CONVERTER

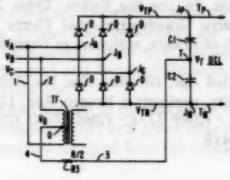
Charles W. Edwards, Monroeville Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 17, 1986, Ser. No. 908,418
Int. Cl.[4] H02M 7/06
U.S. Cl. 363—126 **4 Claims**

1. In a static AC/DC converter, including an array of power switches mounted in a bridge across three AC terminals of a three-phase power supply and two DC output terminals, with

at least two capacitors connected across said DC output about a common point, the combination of:

means for connecting two of said three AC terminals symmetrically about a junction point representing half the resultant of the phase voltages associated with said two AC terminals, respectively; and



resistor means interconnecting said capacitor common point and said junction point;

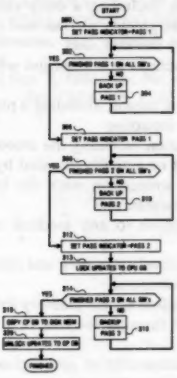
whereby any leakage unbalance between said capacitors is dissipated through said resistor means.

4,686,620

DATABASE BACKUP METHOD

Fred K. Ng, Naperville, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 26, 1984, Ser. No. 634,460
Int. Cl.[4] G06F *13/00*
U.S. Cl. 364—200 **10 Claims**



1. In a distributed data base system having a central computer, a central computer main memory, a central computer mass memory, and a plurality of peripheral data base memories, a method of generating a backup copy of the contents of each of the peripheral data base memories in the central computer mass memory, comprising the steps of

setting indications of modifications to the stored contents of a peripheral memory as modifications are made,

executing a plurality of update passes on each of the peripheral memories, wherein each pass except the last pass includes

allowing update modifications to occur to the peripheral memory being backed-up at a given time during execution of the pass,

sequentially examining the modification indications and transmitting indicated modifications of the peripheral memory being backed-up at a given time from the peripheral memory to the mass memory,

removing indications of modifications as the modifications are transmitted to the mass memory,

executing a last update pass on each of the peripheral memories, wherein the last pass includes

inhibiting update modifications to the peripheral memory being updated at a given time, and

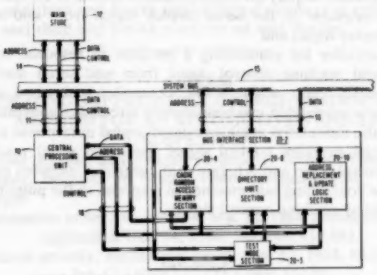
transmitting all modifications to the peripheral memory being backed-up indicated to be present at the beginning of the last pass to the mass memory.

4,686,621

TEST APPARATUS FOR TESTING A MULTILEVEL CACHE SYSTEM WITH GRACEFUL DEGRADATION CAPABILITY

James W. Keeley, Hudson; Robert V. Ledoux, Litchfield, both of N.H., and Virendra S. Negi, Pepperell, Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Jun. 30, 1983, Ser. No. 510,079
Int. Cl.[4] G06F *11/00*; G11C *7/00, 29/00*
U.S. Cl. 364—200 **29 Claims**



1. For use in a system, test mode control apparatus for verifying the operation of a cache unit including cache and directory stores, each organized into the same number of levels of storage locations, and degradation mode control means coupled to said stores and operative in response to errors detected during the process of accessing data stored in said cache storage locations to automatically degrade the operation of said cache unit to those directory and cache store levels which are free from errors, said test mode control apparatus being operatively coupled to a processing unit for receiving cache commands coded to specify the type of operation to be performed by said test mode control apparatus, each cache command including a first field including a number of level bits coded to specify the states of each of said number of levels, said number being greater than one said test mode control apparatus being coupled to said degradation mode control means and to said processing unit, said test mode control apparatus including:

means coupled to said processing unit for applying said number of level bits to said degradation mode control means; and,

logic means coupled to said processing unit for receiving each of said cache commands and said logic means being coupled to said degradation mode control means and operative to condition said degradation mode control means to alter said number of levels to conform to said states of said number of level bits in response to said cache commands.

4,686,622
COMPUTER SYSTEM ARCHITECTURE USING SERIAL COMMUNICATION

Gilbert P. Hyatt, P.O. Box 4584, Anaheim, Calif. 92803

Division of Ser. No. 101,881, Dec. 28, 1970, which is a continuation-in-part of Ser. No. 879,293, Nov. 24, 1969, abandoned. This application Dec. 14, 1977, Ser. No. 860,259
Int. Cl.[4] G06F *15/46*
U.S. Cl. 364—200 25 Claims

1. A computer system comprising:

operator input means for generating a serial operator input signal;

an integrated circuit computer including

a. an integrated circuit main memory for storing computer instructions,

b. an integrated circuit alterable memory for storing computer operands,

c. integrated circuit processing logic for processing the computer operands stored in said alterable memory in response to the serial operator input signal from said operator input means under control of the computer instructions stored in said main memory,

d. integrated circuit serial display logic for generating a serial display signal in response to the processing of computer operands with said processing logic, and

e. integrated circuit serial machine control logic for generating a serial machine control signal in response to the processing of computer operands with said processing logic;

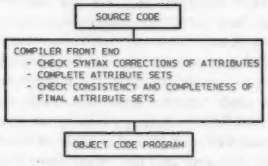
an operator display for displaying information to an operator in response to the serial display signal from said serial display logic; and

a controller for controlling a machine in response to the serial machine control signal from said serial machine control logic, wherein said controller includes a serial pulse modulated machine control circuit for generating a pulse modulated machine control signal in response to the serial machine control signal from said serial machine control logic and wherein said controller includes means for controlling said machine in response to the pulse modulated machine control signal.

4,686,623
PARSER-BASED ATTRIBUTE ANALYSIS

David R. Wallace, Winchester, Mass., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 7, 1985, Ser. No. 742,493
Int. Cl.[4] G06F *9/44*
U.S. Cl. 364—300 8 Claims

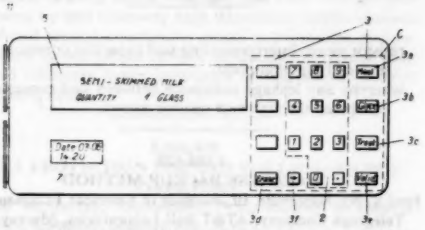

SOURCE CODE
COMPILER FRONT END
- CHECK SYNTAX CORRECTIONS OF ATTRIBUTES
- COMPLETE ATTRIBUTE SETS
- CHECK CONSISTENCY AND COMPLETENESS OF FINAL ATTRIBUTE SETS
OBJECT CODE PROGRAM

1. A compiler of the type for receiving and compiling a source program in a predetermined programming language, and wherein said source program assigns attributes to data items employed in said program and said programming language including attribute grammar rules with which said attribute assignments must comply, said compiler including attribute analysis means for checking the consistency of attributes assigned to a particular data item by said program and for selectively assigning default attributes to said data items, said attribute analysis means comprising a table-driven attribute parser including a syntax table and a parse driver for verifying that said attribute assignments comply with said attribute grammar rules.

4,686,624
PORTABLE APPARATUS FOR ACQUIRING AND PROCESSING DATA RELATIVE TO THE DIETETICS AND/OR THE HEALTH OF A PERSON

Dominique Blum, 14, rue due Vallon, Thise, 25220 Roche Lez Beaupre; Pierre Grandmottet, and Pierre Bechtel, both of Besancon, all of France, assignors to Dominique Blum, Paris, France

Filed Apr. 10, 1984, Ser. No. 598,709
Claims priority, application France, Apr. 12, 1983, 8305949
Int. Cl.[4] G06F *15/42*; G06G *7/60*; G01D *9/00*
U.S. Cl. 364—415 5 Claims



1. A portable apparatus for acquiring and processing information relative to the diet of a person undergoing medical treatment, said apparatus comprising a portable unit comprising in combination:

(a) first inputting means for inputting

diet instructions, including a daily reference amount of proteids, lipids, glucids, alcohol and calories allowed to be ingested by the user, and

treatment instructions in connection with a medical treatment;

(b) second inputting means, including a plurality of alphanumeric keys, for inputting

dietetic information including the amount of each type of food intended or actually ingested by the user,

information in connection with the health of a person using the apparatus, and

information relative to any medical treatment actually performed;

(c) means for effectively inputting and refusing inputting the said dietetic information;

(d) at least one random access memory for storing the information inputted through the said first and second inputting means;

(e) clock means connected to said second inputting means for providing a date for each input to the said random access memory of information from said second inputting means and including dietetic information relative to the food actually ingested, the amount of glucose as measured and the treatment actually performed;

(f) at least one read only memory for storing data relative to a predetermined number of foods and including the average proteid, glucid, lipid, alcohol content of the food;

(g) a display means for displaying said information stored in the said random access memory and said data stored in said read only memory;

(h) computer means for receiving the inputted information stored is said random access memory and the data stored in said read only memory and for, responsive thereto,

determining for each type of food as a function of the quantity of food inputted at one time through the said inputting means the amount of proteids, lipids, glucids, alcohol and calories, causing these amounts to be displayed on said displaying means and providing thereafter for storage of these amounts with an appropriate date in said random access memory, upon actuation of

the said means for effectively inputting of information from said second inputting means,

providing from time to time to a person using the apparatus appropriate information relative to the diet instructions and to the treatment instructions such as are initially inputted in the random access memory from said first inputting means,

causing said daily reference amount of proteids, lipids, glucids, alcohol and calories to be displayed on the said displaying means and modifying the said reference amount as a function of the type and quantity of foods actually ingested and inputted through the second inputting means, and

resetting the said amount of the maximum value of the said daily reference amount at a given time based upon the time information received from the clock means, for the next day;

(i) electric power supply means for powering the apparatus; and

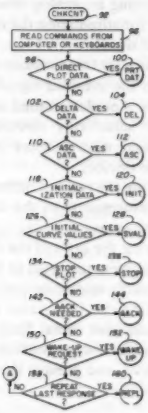
(j) connector means, adapted to connect said first inputting means and said random access memory to an external unit including a computer under doctor's control, for enabling initially inputting from the external unit the said diet instructions including the daily reference amount of proteids, lipids, glucids, alcohol and calories allowed to the user, for enabling initially inputting from the external unit the said treatment instructions and for enabling transferring to said external unit the said information inputted through the said second inputting means and stored in the said random access memory.

4,686,625

METHOD AND APPARATUS FOR GENERATING A DISPLAY OF WELL LOGGING MEASUREMENTS

John N. Bryan, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 7, 1984, Ser. No. 648,863
Int. Cl.[4] G01V *1/00*
U.S. Cl. 364—422 **18 Claims**



1. A method for generating at a first location a visual display corresponding to well logging data present at a second location, comprising:

(a) generating a digital initialization data block at said second location;

(b) transmitting said data block to said first location;

(c) storing said data block at said first location;

(d) generating at said second location a digital representation of a first value of said logging data derived at a first depth within a borehole;

(e) transmitting said digital representation to said first location;

(f) storing said digital representation at said first location;

(g) deriving at said first location from said stored data block a first set of digital numbers corresponding to first positions on said display;

(h) deriving at said first location from said stored digital representation of aid logging data second set of digital numbers corresponding to second positions on said display;

(i) displaying at said first location visual representations of said first and second sets of digital numbers at respective said first and second positions on said display;

(j) generating at said second location a digital representation of a delta data value corresponding to the difference between said first value of logging data derived at said first depth and a second value of said logging data derived at a second depth within said borehole;

(k) transmitting said digital representation of said delta value to said first location;

(l) storing said digital representation of said delta value at said first location;

(m) deriving at said first location from said stored data block a third set of digital numbers corresponding to third positions on said display;

(n) deriving at said first location from said stored first value of said logging data and said delta data value a fourth set of digital numbers corresponding to fourth positions on said display; and

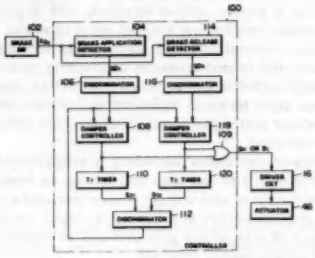
(o) displaying at said first location visual representation of said third and fourth sets of digital numbers at respective said third and fourth positions on said display.

4,686,626

PITCHING-SUPPRESSIVE CONTROL SYSTEM AND METHOD FOR AN AUTOMOTIVE VEHICLE SUSPENSION

Junsuke Kuroki, and Fukashi Sugasawa, both of Yokohama, Japan, assignors to Nissan Motor Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 649,484, Sep. 11, 1984, abandoned. This application Oct. 14, 1986, Ser. No. 919,602
Claims priority, application Japan, Sep. 17, 1983, 58-171878
Int. Cl.[4] B60G *17/00*; G06F *15/20*
U.S. Cl. 364—426 **17 Claims**



1. A damper control system for an automotive vehicle suspension having a damping characteristic comprising:

first means, interposed between a sprung mass and an unsprung mass of the vehicle, for producing a damping force resisting relative displacement of said sprung mass and said unsprung mass;

a braking condition detector for producing a binary braking state indicative signal pulse having a leading edge and a trailing edge, the pulse extending as long as a vehicle brake is applied;

an actuator for operating said first means between a first and a second position to change the damping characteristics of

the suspension to produce a higher damping force in the first position, and to produce a lower damping force in the second position; and

a controller connected with said actuator and said braking condition detector to operate said actuator at the first position in response to each of the leading and trailing edges of the braking state indicative signal pulse.

14. A method of controlling a damper or dampers of a vehicle suspension system, comprising the steps of:

providing means for adjusting stiffness of said damper or dampers;

detecting the application of vehicle brakes and generating a binary braking state indicative signal pulse having a leading edge representative of the application; and

increasing the stiffness of said damper or dampers for a predetermined period of time in response to the leading edge of the brake indicative signal.

4,686,627

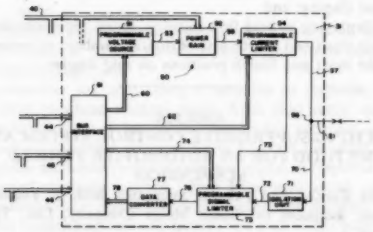
ELECTRICAL TEST APPARATUS

William J. Donovan, San Bernardino, and George G. Sanford, Los Angeles, both of Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 24, 1984, Ser. No. 685,695

Int. Cl.[4] **G01R** *15/12;* **G06F** *1/02, 15/20*

U.S. Cl. 364—481 **1 Claim**



1. Test apparatus for testing electrical circuit components, said components each including test pins, said test apparatus comprising:

a plurality of pin modules each having a common conducting means for connection to selected ones of said test pins;

each module including a programmable power distributor, having a power output terminal, and a programmable processor unit having a signal input terminal, said power output terminal and said signal input terminal having a connection to said common conducting means, said connection between said common conducting means and said signal input terminal including an isolation unit operable to isolate said signal input terminal from said power output terminal;

said power distributor including a programmable voltage source unit, a power gain unit having an input connected to an output of said voltage source unit, and a programmable current limiter unit having an input connected to an output of said power gain unit and an output comprising said power output terminal;

a computer coupled to said modules, said computer including means for selectively programming said programmable units of said modules and means for transmitting data signals to said modules and to receive data signals from said modules;

said programmable current limiter unit including a current sensing stage, a controlled output stage, an absolute value stage and an output control stage, said current sensing stage being connected between said input of said current limiter unit and said controlled output stage to produce a voltage signal representative of the magnitude and direction of current flow controlled by said output stage, said absolute value stage being connected to convert said voltage signal to an absolute value signal irrespective of current flow direction, said absolute value signal being applied as a first input signal to said output control stage, a second input signal to said output control stage being derived from said computer, said control stage being operative in response to said first and second input signals to control the operation of said controlled output stage in accordance with programatic instructions from said computer; and

means supplying said absolute value signal to said programmable signal processor for transmittal to said computer.

4,686,628

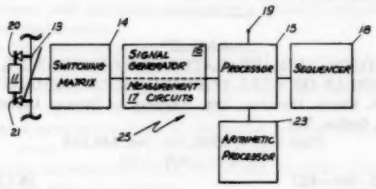
ELECTRIC DEVICE OR CIRCUIT TESTING METHOD AND APPARATUS

Keibock Lee, Troy, and Robert V. Dvorak, Scotia, both of N.Y., assignors to Fairchild Camera & Instrument Corp., Clifton Park, N.Y.

Filed Jul. 19, 1984, Ser. No. 632,460

Int. Cl.[4] **G01F** *15/20;* **G06G** *7/62;* **G05B** *13/02;* **G01R** *31/28*

U.S. Cl. 364—481 **12 Claims**



9. A systme for testing an analog device comprising

a signal generator for stimulating the device with a predetermined electrical signal,

means for taking at least three measurements of the response of the device to the stimulus signal which measurements are separated by a predetermined and equal time delay,

circuit means for selectively electrically connecting and disconnecting said measurement means and said signal generator to the device,

means for comparing the ratio of difference between the first and second measurements to the difference between the second and third measurements,

means for comparing the ratio of the difference between the second and third measurements to the difference between the third and fourth measurements,

means for predicting the final value of the response of the device to the stimulus signal from the measured values according to the following relationship when such ratios are equal, positive, and greater than unity:

$$\text{predicted final response} = \frac{Y^2 - XZ}{2Y - X - Z}$$

wherein

X equals the second measured value of the response,

Y equals the third measured value of the response, and

Z equals the fourth measured value of the response, and

means for comparing the predicted final response to a response value derived from a functioning device thereby evaluating whether the device under test is functioning or not functioning.

4,686,629

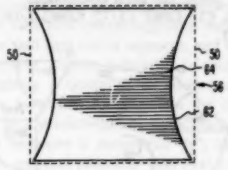
LOGIC CELL PLACEMENT METHOD IN COMPUTER-AIDED-CUSTOMIZATION OF UNIVERSAL ARRAYS AND RESULTING INTEGRATED CIRCUIT

Richard Noto, Maple Shade, and David C. Smith, Williamstown, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Continuation of Ser. No. 608,788, May 10, 1984, abandoned. This application Jul. 21, 1986, Ser. No. 886,936

Int. Cl.[4] G06F *15/20*

U.S. Cl. 364—491 **16 Claims**



1. In a computer-programmed method of placing logic cells during the conversion of a universal array having a row region including rows of basic circuit units into a custom IC in which said array has more of said basic units in its row region than said IC requires for it's implementation whereby the final IC includes some unused basic units, the improvement comprising the step of:

allocating at least some of said unused basic units to specific rows of said row region with the center row when there are an odd number of rows and one of the center two rows when there are an even number of rows being allocated the most unused basic units and with the number of unsed basic units allocated to said rows decreasing monotonically with the distance from said center row(s); and

preventing said allocated unused basic units from being moved from the respective rows to which they are allocated.

13. In a customized universal array IC of the type including a row region in which basic units are arranged in a plurality of parallel rows and in which some of said basic units are active and some are unused, the improvement comprising:

said unused basic units being distrubuted among said rows with the largest number of said unused basic units disposed in the center row when there are an odd number of rows and one of the center two rows when there are an even number of rows and with the number of unused basic units in each row decreasing monotonically with the distance of that row from said center row(s).

4,686,630

LOAD MANAGEMENT CONTROL SYSTEM AND METHOD

Charles N. Marsland, Westborough, Mass., and Ralph J. Jannelli, Charlotte, N.C., assignors to Process Systems, Inc., Charlotte, N.C.

Filed Sep. 27, 1984, Ser. No. 655,205

Int. Cl.[4] G06F *15/06;* **H02J** *3/10*

U.S. Cl. 364—492 **22 Claims**

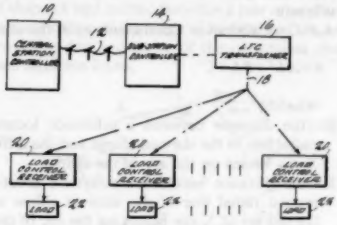
1. A power distribution system including load tap changing transformers and associated conventional voltage maintenance circuits, comprising:

substation controller means, associated with each load tap changing transformer, for responding to overide and control signals input thereto to override normal tap changing operation of said voltage maintenance circuits, and for subsequently and selectively controlling the tap position of said tap changing transformer to produce step changes in the line voltage output of said tap changing transformer to thereby produce an encoded message;

central station controller means for inputting said override and control signals to said substation controller means; and,

a plurality of load control receiver means for monitoring said step line voltage changes caused by said load tap changing transformer and, in response to said encoded message, selectively interrupting power to loads which are uniquely associated with each of said plurality of receiver means.

12. A method of controlling loads through a power distribution system, comprising the steps of:



selectively controlling the tap position of a tap changing transformer to generate step line voltage changes in said tap changing transformer output to thereby produce a multi-bit digitally encoded signal impressed on the line voltage;

monitoring the line voltage and decoding said encoded signal; and

selectively deenergizing specific loads in accordance with said encoded signals.

4,686,631

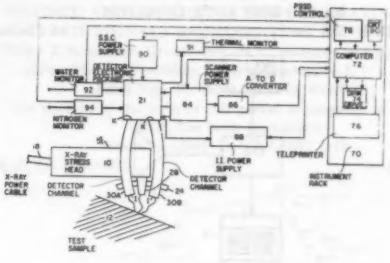
METHOD FOR DETERMINING INTERNAL STRESSES IN POLYCRYSTALLINE SOLIDS

Clayton O. Ruud, 310 Toftrees Ave., #135, State College, Pa. 16803

Filed Feb. 8, 1985, Ser. No. 699,992

Int. Cl.[4] G01C *25/00;* **G01N** *23/20;* **G01B** *5/30*

U.S. Cl. 364—508 **12 Claims**



1. A method of obtaining calibration coefficients for residual internal stress measurements in polycrystalline specimens without accurate control or auxiliary measurements of the specimen to detector distance, R_o; the method comprising the steps of:

(a) directing a monochromatic X-ray beam of known wavelength at a β angle equal to zero at an area of homogeneous stress on a polycrystalline calibration specimen, in which β equals the angle between the line of the incident X-ray beam and the normal to the specimen surface,

(b) measuring the radial distance between reference locations on at least two radii of a skewed ellipse which is formed on a plane normal to the cone axis, for which the line of the incident X-ray beam is coincident with the axis

of an elliptical cone of diffraction rays, and at least two diffracted sets of X-ray beams on the rays, and at least two diffracted sets of X-rays beams on the arc of the ellipse, where at least two of the diffracted sets of X-ray beams are opposite each other on the ellipse,

(c) repeating step (b) at least twice, each time with a change in specimen to detector distance, R_o, with at least one of these distances being the idel R_o distance which describes a circle along the circumference of which the X-ray detector surfaces are located,

(d) calculating calibraction coefficients A, B, C, S_{o1}, and S_{o2} wherein

A,B,C=Calibration Coefficients as in the equation

$$R=A\cdot L^2+B\cdot L+C$$

wherein

R=the distance between a reference location along a radial line of the skewed ellipse and the diffracted set of X-ray beams on the arc of the ellipse,

L=the distance between a reference location along a second radial line of the skewed ellipse and the diffracted set of X-ray beams on the arc of the ellipse,

S_{o1}=a calibration coefficient representing the distance between the same reference location as for L along a radial line of the skewed ellipse and the spot representing the intersection of the line of the incident X-ray beam and the aforementioned plane normal to the cone axis, and

S_{o2}=a calibration coefficient representing the distance between the same reference location as for R along a second radial line of the skewed ellipse and the spot representing the intersection of the line of the incident X-ray beam and the aforementioned plane normal to the cone axis.

4,686,632

METHOD AND APPARATUS FOR GENERATING A SET OF SIGNALS REPRESENTING A CURVE

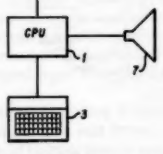
Ricky J. Schrieber, Great Neck, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1984, Ser. No. 649,011

The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.[4] G06F *15/72*; G09G *1/06*

U.S. Cl. 364—518 **16 Claims**



1. A method of creating a data base on storage media including the steps of encoding the data in a computer memory, said data representing knots on an outline defined relative to a coordinate plane, the method including the steps of:

(a) selecting sets of coordinates on said outline, to represent said knots,

(b) establishing a successive order of said knots, and

(c) encoding said knots in a data order, in computer memory, indicative of said knot order, and

said step (c) of encoding including the step (d) of encoding a complete information set of data providing a control code indicative of either (i) the coordinate locations of said knots or (ii) a knot's direction relative to others of said knots or (iii) a predetermined shape of said outline between a pair of said knots or (iv) data indicative of the shape of said outline at a knot for later use in generation of a visual representation of the outline in a display process.

4,686,633

METHOD AND APPARATUS FOR GENERATING A SET OF SIGNALS REPRESENTING A CURVE

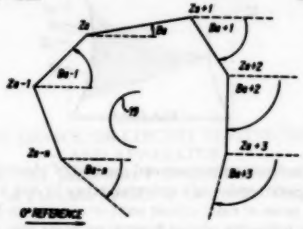
Ricky J. Schrieber, Great Neck, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1984, Ser. No. 649,088

The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.[4] G06F *15/72*; G09G *1/06*

U.S. Cl. 364—523 **11 Claims**



1. A method of creating a data base on storage media including encoding data in a computer memory, the data representing knots on an outline loop defined relative to a coordinate plane, for producing a display image of said outline and then decoding the data responsive to the interrelationship of said knots on said outline loop, and, using the data to image said outline loop responsive to said decoded data, the method including the steps of:

(a) selecting sets of coordinates on said outline loop, to represent said knots,

(b) establishing a successive order of said knots,

(c) encoding said knots in a data order in computer memory indicative of said knot order, and said step (c), of encoding including the step (d), of encoding a complete information set of data indicative of the coordinate distances and interknot angles between adjacent knots,

(d) comparing the relative positions of successive knots to at least a first interknot criterion.

(e) responsive to said step (e), of comparing, (i) producing a first indication that a set of said successive knots is within said criterion, or (ii) producing a second indication that a set of said successive knots is outside said criterion, and

(f) (i) responsive to said first indication, imaging said outline loop on a display in the form of a smooth continuous curve, or (ii) responsive to said second indication, imaging said outline loop in the form of a straight line, between said set of successive knots.

4,686,634

METHOD AND APPARATUS FOR GENERATING A SET OF SIGNALS REPRESENTING A CURVE

Ricky J. Schrieber, Great Neck, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1984, Ser. No. 649,040

The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.[4] G06F *15/72*; G09G *1/06*

U.S. Cl. 364—523 **16 Claims**

1. A method of creating a data base on storage media including the steps of a method for (i) generating a series of signals representing nodes on a locus of a curve partially defined by a set of related knots, encoded as data, with said knots defining the end points of respective segments of said curve locus and with said knots being in a successive order in relation to said locus, and for (ii) encoding said node signals as data for use when representing said curve segments in a separate additional

process responsive to the shape of said curve locus, as represented by said encoded node signals, and said method of creating the data base further comprising the steps of:

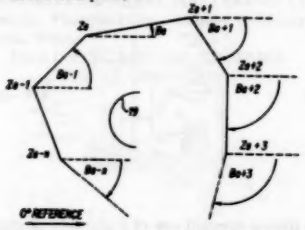
(a) defining the locations and the successive order of said knots on said curve locus and encoding as data on a storage media, signals indicative of said knots,

(b) for a first knot, (Z_a), representing a first end point of a first curve segment, deriving a first angle, indicative of the average of the interknot angles between said first knot (Z_a), and selected related knots, and encoding as data, in computer memory, signals indicative of said first angle,

(c) at a second of said knots (Z_b), representing a second end point of said first curve segment, establishing a second angle for said first curve segment, and encoding as data in the computer, signals indicative of said second angle,

(d) establishing a compiler in computer memory, which compiler generates locus points for compiling data according to a predetermined cubic parametric polynomial function between a parameter "t", said knots and said angles at said end points of said first curve segments and the locus of a said first curve segment,

(e) establishing a limited range "R" of values for said parameter "t" in the compiler,



(f) in the computer memory, applying said signals indicative of said locations of said first and second knots of said first curve segment, to said compiler,

(g) in the computer memory, applying said signal indicative of the said first and second angles of said first curve segment to said compiler,

(h) applying a signal indicative of a distinct selected value of said parameter "t" within said range "R", to said compiler to derive a signal indicative of a respective node location on said first curve segment,

(i) repeating step (h) by applying signals indicative of additional distinct selected values of said parameter "t", within said range "R", to derive a plurality of signals indicative of respective node locations on said locus of said first curve segment for respective distinct selected values of said parameter "t", and

(j) encoding said signals derived in step (h) and (i), in a data base in memory for later sorting to represent said first curve segment for later generation of a visual representation of said curve by using said data signals directly to control display process and visually display the curve pattern.

4,686,635

METHOD AND APPARATUS FOR GENERATING A SET OF SIGNALS REPRESENTING A CURVE

Ricky J. Schrieber, Great Neck, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1984, Ser. No. 649,021

The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.[4] G06F *15/72*; G09G *1/06*

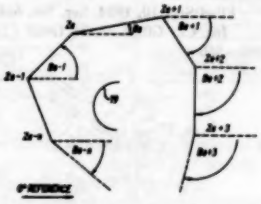
U.S. Cl. 364—523 **16 Claims**

1. A method of creating data base on storage media including the steps of encoding the data in a computer memory, said data representing knots on an outline defined relative to a coordinate plane and of decoding said encoding data for use in a display process to produce images of said outlines represented by said encoded data, the method including the steps of:

(a) selecting sets of coordinates on said outline, to represent said knots,

(b) establishing a successive order of said knots,

(c) encoding said knots in a data order, in computer memory, indicative of said knot order, said step (c) of encoding on a storage media including encoding a complete information set of data providing a control code indicative of one of (i) the coordinate locations of said knots or (ii) a knot's direction relative to others of said knots or (iii) a predetermined shape of said outline between a pair of said knots or (iv) data indicative of the shape of said outline at a knot, or (v) providing data indicative of the coordinate distances between adjacent knots,



(d) decoding said complete information sets in a decoding order related to said data order,

(e) responsive to said complete information set being indicative of the coordinate distances between adjacent knots, producing an image on a display of a smooth continuous curved outline or a straight line between said adjacent knots, or

(f) responsive to said complete information sets being indicative of a control code, producing an image of a smooth continuous curved outline or a straight line according to said coordinate locations of said knots relative to adjacent knots in said successive knot order or producing an image on a display of said outline being smooth at respective knots or being sharp and forming cusps at respective knots.

4,686,636

METHOD AND APPARATUS FOR GENERATING A SET OF SIGNALS REPRESENTING A CURVE

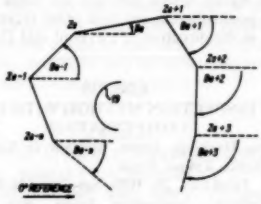
Ricky J. Schrieber, Great Neck, N.Y., assignor to Allied Corporation, Morris Township, Morris County, N.J.

Filed Sep. 10, 1984, Ser. No. 649,041

The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.[4] G06F *15/72*; G09G *1/06*

U.S. Cl. 364—523 **27 Claims**



1. A method of creating a data base on a storage media including the steps of encoding the data in a computer memory, said data representing knots on an outline defined relative to a coordinate plane and for generating a series of signals representing nodes on the locus of a curve partially defined by said set of knots, the method including, the steps of:

(a) selecting sets of coordinates on said outline, to represent said knots,

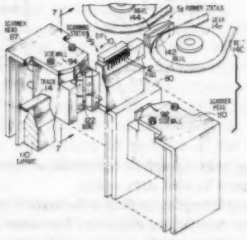
(b) establishing a successive order of said knots, and
(c) encoding said knots in a data order in computer memory indicative of said knot order, and
said step (c) of encoding on a storage media a complete information set of data providing a code indicative of a predetermined shape of said outline between a pair of said knots or a complete information set providing the coordinate distances between adjacent knots.

4,686,637

APPARATUS AND METHOD FOR LEAD INTEGRITY DETERMINATION FOR DIP DEVICES

Frank V. Linker, Jr., Broomall, Pa., and Thomas E. Shuren, Stanhope, N.J., assignors to American Tech Manufacturing, Inc., Glenolden, Pa.

Filed Sep. 10, 1984, Ser. No. 648,872
Int. Cl.[4] G01R *31/04*; G06F *15/46*
U.S. Cl. 364—550 **26 Claims**



1. In an apparatus for determining lead integrity of DIP devices, wherein the leads of said DIP devices extend from a track for supporting said DIP devices during passage through said apparatus, the improvement comprising:
transmitting means for the transmission of a signal, positioned so that the leads of said DIP devices traveling on said track intersect the transmitted signals;
receiving means for receiving and converting a transmitted signal to an electrical signal, positioned so that as said leads of said DIP device intersect said transmitted signal, said receiving means generates an electrical signal reflective of said intersection for determining the integrity of said leads based upon said electrical signal, said receiving means including receptors positioned on either side of said track such that each receptor receives said transmitted signal intersected by said leads as said DIP devices travel on said track, said receptors being arranged wherein a first receptor is oriented upstream along said track and wherein at least two other receptors are oriented such that one is further than the other from said track in order to receive signals which intersect the leads at at least two spaced points therein and both other receptors are downstream in the direction of travel of said DIP devices.

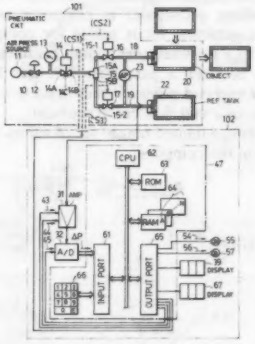
4,686,638

LEAKAGE INSPECTION METHOD WITH OBJECT TYPE COMPENSATION

Akio Furuse, Hachioji, Japan, assignor to Kabushiki Kaisha Kosumo Keiki, Tokyo, Japan

Filed Oct. 29, 1984, Ser. No. 666,082
Claims priority, application Japan, Nov. 4, 1983, 58-171441[U]; Nov. 21, 1983, 58-180680[U]; Jan. 6, 1984, 59-669[U]
Int. Cl.[4] G01M *3/32*; G06F *15/46*
U.S. Cl. 364—558 **3 Claims**

1. In a leakage inspection method of the type wherein successive inspection cycles are performed each of which cycles includes a pressurizing procedure for applying an air pressure to an object to be inspected, followed by a balancing procedure for stabilizing the air pressure in said object, followed by an inspecting procedure wherein pressure measuring means are used to detect any change in pressure in the object a fixed period of time after completion of said balancing procedure, the improvement wherein said inspecting procedure comprises the steps of:
zero-resetting an amplifier at the start of said inspecting procedure, said amplifier receiving a pressure signal from said pressure measuring means
A-D converting the output from the amplifier by use of an A-D converter to produce currently measured pressure change data ΔP_i in a digital form;
reading out a number of previously measured pressure change data up to a predetermined fixed number of such



data from a selected one of a plurality of storage regions which are provided in a storage means, said storage regions corresponding respectively to different types of the object which are to be inspected, and said selected region corresponding to the type of object that is currently being inspected;
averaging the measured data read out from said selected storage region to produce an average value $\Delta\bar{P}_{fi}$;
computing a difference δ_i between the currently measured data ΔP_i and the average value $\Delta\bar{P}_{fi}$;
comparing the difference δ_i to a limit value δ_o; and
when δ_i is less than δ_o, producing an accept signal and storing said currently measured data in the said selected storage region of said storage means.

4,686,639

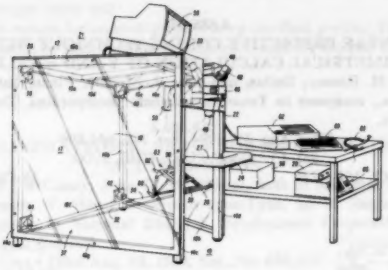
FREE SPACE MICROSCOPE DIGITIZING AID

Charles A. Johnson, Hiawatha, and Jerald A. Young, Marion, both of Iowa, assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 7, 1985, Ser. No. 699,285
Int. Cl.[4] G01N *29/04*; G01S *3/84*; G06F *15/32*
U.S. Cl. 364—559 **9 Claims**

4. A method for inspecting an item comprising:
positioning an item to be inspected to define a plane of inspection;
positioning at least three sonic emitters in fixed relation with respect to said plane of inspection and movable therewith;
positioning at least three receivers in fixed relationship with respect to one another;
defining a line of sight intersecting said plane of inspection;
viewing said item at a point of intersection between said line of sight and said plane of inspection;
energizing said sonic emitters to produce sonic energy; and
receiving said emitted sonic energy at said at least three receivers; and

calculating the position of said point of intersection derived from said received sonic energy and representing the



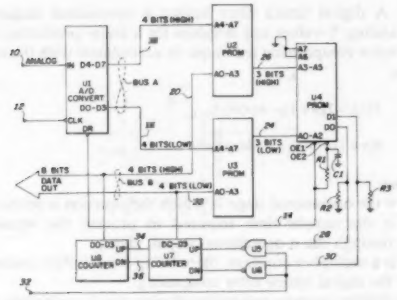
intersection of said line of sight with said plane of inspection.

4,686,640

PROGRAMMABLE DIGITAL HYSTERESIS CIRCUIT

Paul C. Simison, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 12, 1984, Ser. No. 680,860
Int. Cl.[4] H04N *5/21*
U.S. Cl. 364—571 **10 Claims**



1. Digital control apparatus for stabilizing the value of an input digital signal having error components superposed thereon by interposing a predetermined value of hysteresis, comprising:

data output means for generating a reference digital signal for energizing a digital display,

digital data store means for storing correction factor signals in binary form representative of differences between said input digital signal and said reference digital signal for differences that exceed said predetermined value of hysteresis and for storing a quiescent command representative of no change in said reference digital signal for differences that do not exceed said predetermined value of hysteresis,

means to apply said input digital signal and said reference digital signal to said digital data store means,

means for reading out said correction factor signals from said digital data store means corresponding to said applied signals, and

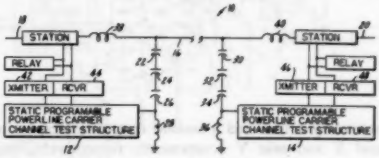
means for applying said correction factor signals to said data output means so as to increment or decrement said output means in a direction to reduce differences between said input digital signal and said reference digital signal when said differences exceed said predetermined value of hysteresis and for applying said quiescent command to said data output means so as to effect no change in said reference digital signal when said differences do not exceed said predetermined value of hysteresis.

4,686,641

STATIC PROGRAMMABLE POWERLINE CARRIER CHANNEL TEST STRUCTURE AND METHOD

James W. Evans, Grosse Pointe Farms, Mich., assignor to Detroit Edison Company, Detroit, Mich.

Filed Mar. 18, 1985, Ser. No. 713,173
Int. Cl.[4] G05B *19/02;* **H04M** *11/04, 1/24*
U.S. Cl. 364—580 **5 Claims**



1. A system for testing condition of an electrical power line carrier channel between at least first and second separated stations on said line, said system comprising

first and second test apparatus respectively positioned at said stations, each said test apparatus including signal transmitting and receiving means connected to said power line, and microprocessor-based control means coupled to said transmitting and receiving means for selectively transmitting signals to and receiving signals from other said test apparatus connected to said power line,

one of said control means including means for selectively initiating a test sequence, means responsive to said initiating means for applying a first signal of preselected first time duration to said power line through associated said transmitting means at one of said first and second stations,

another of said control means including means for monitoring said first signal through associated said receiving means at the other of said stations by comparing time duration thereof to a first preselected time interval, and means for applying a second signal of second preselected time duration to said power line through associated said transmitting means at said other station following receipt of said first signal when time duration of said first signal is greater than said first time interval,

said one of said control means further including means for monitoring said second signal through associated said receiving means at said one of said stations by comparing time duration of said second signal to a second preselected time interval, and means for indicating an alarm condition at said one station when time duration of said second signal is less than said second preselected time interval,

each of said microprocessor-based control means including means for selectively structuring said control means as said one control means or said other control means, such that said test sequence may be selectively initiated from either of said first and second stations.

4,686,642

METHOD AND APPARATUS FOR GENERATING A STROKE ON A DISPLAY

James L. Buxton, East Palo Alto; Alan C. Phillips, Los Altos, and Stanley K. Honey, Newark, all of Calif., assignors to Etak, Inc., Menlo Park, Calif.

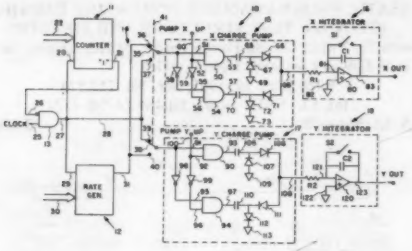
Filed Oct. 18, 1984, Ser. No. 662,183
Int. Cl.[4] G06G *7/00, 7/16*
U.S. Cl. 364—607 **23 Claims**

1. An apparatus for generating a stroke having an X and a Y component on a display comprising:

means for providing a first pulse train having a first pulse rate;

means for providing a second pulse train having a second pulse rate; and

means responsive to said first and said second pulse trains for



providing a first and a second output corresponding to said X and said Y components, respectively, each of whose rate of change is linearly related to a different one of said first and said second pulse rates.

4,686,643

ELECTRONIC EQUIPMENT SELECTIVELY STORING A FREQUENTLY USED CONVERSION FUNCTION

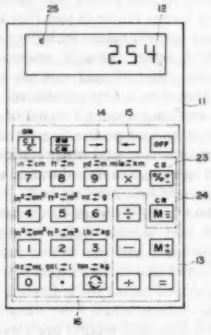
Junichi Ishiwata, c/o Canon Kabushiki Kaisha, 30-2, 3-chome, Shimomaruko, Ohta-ku, Tokyo, Japan

Continuation of Ser. No. 416,053, Sep. 8, 1982, abandoned. This application Jul. 1, 1985, Ser. No. 750,986

Claims priority, application Japan, Sep. 16, 1981, 56-146934

Int. Cl.[4] G06F *5/00*

U.S. Cl. 364—715 **8 Claims**



1. Electronic equipment with a unit conversion function, comprising:

input means having key means for selectively inputting a type of unit conversion and numerical information;

first memory means for storing a conversion rate for the type of unit conversion input by said input means;

second memory means for storing a type of unit conversion input by said input means;

conversion memory set means for loading the type of unit conversion input by said input means in said second memory means; and

instruction means, responsive to actuation of said key means and in cooperation with said first and second memory means, for repeatedly executing the type of unit conversion stored in said second memory means on numerical information repeatedly input by said input means on the basis of the conversion rate stored in said first memory means when said conversion memory set means has stored a type of unit conversion in said second memory means from a previously executed conversion and the conversion rate stored in said first memory means.

4,686,644

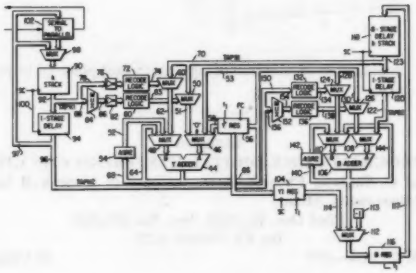
LINEAR PREDICTIVE CODING TECHNIQUE WITH SYMMETRICAL CALCULATION OF Y-AND B-VALUES

Karl H. Renner, Dallas, and Alec J. Morton, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 31, 1984, Ser. No. 646,606

Int. Cl.[4] G06F *15/31*; G10L *1/00*

U.S. Cl. 364—724 **18 Claims**



1. A digital lattice filter having n operational stages for calculating Y-values and B-values for a linear predictive coding voice compression technique in accordance with the equations:

$$Y(n)_i = Y(n+1)_i - k(n)b(n)_{i-1}$$

$$b(n+1)_i = b(n)_{i-1} + k(n)Y(n)_i$$

where:

n is the operational stage in which the equation is processed,

i is the sample time required to process the equations through the n operational stages, and

k is a multiplier constant, there being n multiplier constants, the digital lattice filter comprising:

multiplier storage means for storing the k multiplier constants in a predetermined order;

B-delay means for storing and delaying calculated B-values received in the i sample time for output in the next sample time i+1;

Y-value storage means for storing calculated Y-values $Y(n)_i$ for a given n and a given i sample time for use in subsequent Y-value and B-value calculations as $Y(n+1)_i$;

Y-value calculation means for receiving a multiplier constant k(n) for a given n from said multiplier storage means, a multiplicand $b(n)_{i-1}$ from said B-delay means and a previously calculated Y-value $Y(n+1)_i$ from said Y-value storage means as an addend and calculating a Y-value $Y(n)_i$ therefrom, the output of said Y-value calculation means stored in said Y-value storage means;

B-value calculation means for receiving a multiplier constant k(n+1) for a given n from said multiplier storage means, a multiplicand $Y(n+1)_i$ from the output of said Y-value calculation means and an addend $b(n+1)_{i-1}$ from said delay means for calculation of a B-value $b(n+2)_i$, the output of said B-value calculation means input to said B-delay means for delay thereof;

said Y- and B-value calculation means simultaneously performing a calculation of $Y(n)_i$ and $b(n+2)_i$ for the given n and the given i sample time;

control means for controlling the operation of the digital lattice filter to sequentially calculate the Y- and B-values for decreasing values of n for a given i sample time and

determine the amount of time that calculated B-values stored in said B-delay means in the given i sample time are delayed by said delay means for output in the next i+1 sample time; and

latch means for receiving and storing the final y-value $Y(n)_i$ output by said Y-value calculation means for n equal to 1.

4,686,645

PIPELINED SYSTOLIC ARRAY FOR MATRIX-MATRIX MULTIPLICATION

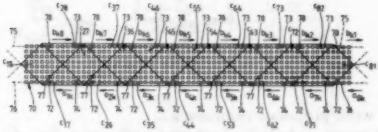
John V. McCanny; John G. McWhirter, both of Malvern, and Kenneth W. Wood, Newcastle-upon-Tyne, all of England, assignors to National Research Development Corporation, London, England

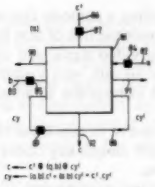
Filed Aug. 10, 1984, Ser. No. 639,423

Claims priority, application United Kingdom, Jul. 28, 1983, 8320362

Int. Cl.[4] G06F *7/52*

U.S. Cl. 364—754 **9 Claims**





1. A digital data processor for multiplying row elements of a first input matrix by column elements of a second input matrix to form a product matrix, the processor including:

a systolic array of processing cells arranged for bit-level multiplication;

data input means for effecting bit-level matrix element input to the array for multiplication of each bit of each first matrix row element by each bit of each of the second matrix elements in a respective column; wherein the data input means is arranged both for matrix input with zeros interspersed between adjacent bits of each matrix element and for producing a cumulative time stagger between input of adjacent rows of the first matrix and adjacent columns of the second matrix,

accumulating means for summing array output contributions to each bit of each product matrix element; and

clocking means for controlling operation of the processing cells, data input means and accumulating means,

the clocking means being arranged to advance both input matrices by one cell through the array on each clock cycle, wherein the processing cells are nearest-neighbour connected and have processing functions to evaluate the product of two input data bits, add the product to an input cumulative sum bit and a carry bit from a next lower order bit computation, output a corresponding result, generate a new carry bit and pass on the input data bits to respective neighbouring cells.

4,686,646

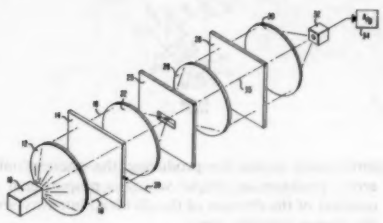
BINARY SPACE-INTEGRATING ACOUSTO-OPTIC PROCESSOR FOR VECTOR-MATRIX MULTIPLICATION

Anastasios P. Goutzoulis, Forest Hills Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 1, 1985, Ser. No. 729,386

Int. Cl.[4] G06G *9/00, 7/16*

U.S. Cl. 364—845 **7 Claims**



1. An optical processor for matrix-vector multiplication, said processor comprising:

a first spatial light modulator;

a second spatial light modulator;

means for applying coherent light to said first spatial light modulator;

means for modulating said first spatial light modulator in parallel with element values from a row in the matrix;

means for focusing the coherent light which passes through said first spatial light modulator onto said second spatial light modulator, said focusing means including second and third spherical lens and an opaque member having an opening therein, said opaque member being located between said second and third spherical lens, said second lens being located adjacent to the first spatial light modulator, and said third lens being located adjacent to the second spatial light modulator;

means for modulating said second spatial light modulator in parallel with element values from a column in said vector;

a single detector located along an axis defined by said lens, said axis passing through the center of said first spherical lens and through the focal point of said lens, and functional to convert converged light from said lens into electrical signals; and

an analog-to-digital converter to which the electrical signals from said detector are applied, said analog-to-digital converter functional to convert the electrical signals from said detector to binary form.

4,686,647

NUMERICAL DIVISION OF TWO ARRAYS BY OPTICAL PROCESSING

Bernard H. Soffer, Pacific Palisades; Uzi Efron, West Los Angeles, and Emanuel Marom, Beverly Hills, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 29, 1984, Ser. No. 645,573

Int. Cl.[4] G06G *9/00*

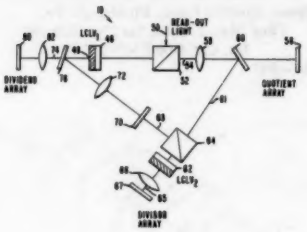
U.S. Cl. 364—850 **16 Claims**

1. Apparatus for simultaneously performing division of a dividend intensity array by a divisor intensity array on a pixel-by-pixel basis, to yield a quotient intensity array, comprising:

means for producing as output the quotient intensity array proportional to an input additive intensity array on a pixel-by-pixel basis; and

means for feeding back a fraction of the output quotient intensity array to said means for producing the quotient intensity array, said fraction being proportional to the divisor intensity array on a pixel-by-pixel basis, said means for feeding back including modulator means for modulating the fractional quotient intensity array with the divisor intensity array to produce a product intensity array and

addition means for adding the product intensity array and the dividend intensity array on a pixel-by-pixel basis, to produce the additive intensity array,



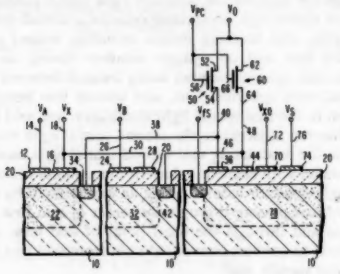
whereby said means for producing the quotient intensity array, produces an output which is proportional to the quotient of the division of the dividend intensity array by the divisor intensity array.

4,686,648

CHARGE COUPLED DEVICE DIFFERENCER

Eric R. Fossum, New Haven, Conn., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 3, 1985, Ser. No. 805,505
Int. Cl.[4] G06G *7/00*
U.S. Cl. 364—862 **18 Claims**



1. A charge coupled device differencer comprising:

a semiconductor substrate (**10**);

first charge transfer means (**12** and **16**) formed on said substrate for receiving and transferring a first quantity of charge carriers;

second charge transfer means (**24** and **28**) formed on said substrate for receiving and transferring a second quantity of charge carriers;

a first charge subtraction means (**34** and **36**) coupled to said first charge transfer means and responsive to said first quantity of charge carriers so as to form a first potential well in said substrate having a level determined by said first quantity of charge carriers;

second charge subtraction means (**42** and **44**) coupled to said second charge transfer means and responsive to said second quantity of charge carriers so as to form a second potential well in said substrate having a level determined by said second quantity of charge carriers; and

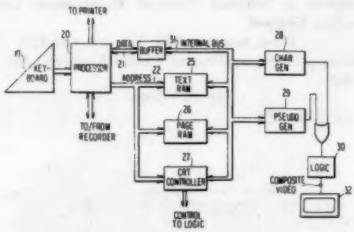
charge reservoir means (**144**) for injecting a third quantity of charge carriers into said first and second potential wells and for removing a fourth quantity of charge carriers from said first and second potential wells, said fourth quantity of charge carriers being less than said third quantity of charge carriers when said first quantity of charge carriers is greater than said second quantity of charge carriers whereby the difference between said third and fourth quantity of charge carriers remains in said second potential well and represents the difference between said first and second quantity of charge carriers.

4,686,649

WORD PROCESSOR WITH ALTERNATIVE FORMATTED AND UNFORMATTED DISPLAY MODES

Elizabeth A. Rush; Dan M. Howell, and Robert A. Kolpek, all of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 268,609, May 29, 1981, Pat. No. 4,495,490. This application Dec. 13, 1984, Ser. No. 681,420
Int. Cl.[4] G06F *3/14, 3/037*
U.S. Cl. 364—900 **32 Claims**



1. A word processor comprising:

input means including a keyboard with a plurality of keys, each associated with a different graphic or function including at least two cursor control keys, said input means producing a unique key code for each actuated key or group of keys,

display means including a cathode ray tube for producing a visible image of multiple line of text in response to a periodically repeating video signal and associated horizontal and vertical sync signals, said visible image including a cursor positioned in response to actuation of said cursor control keys,

control means responsive to said input means for manipulating and storing said unique key codes and for controlling said display means,

wherein the improvement comprises:

dispaly control means in said control means for generating one of a first and second video signal, for driving said display means, in response to selection of one of a first and second display mode respectively,

said first video signal producing an unformatted text display having less display text lines than in a typical page, and less text character capacity per text line than in a typical page,

said second video signal producing a formatted display of capacity at least equal to the number of lines in a typical page wherein each of a plurality of different text characters is represented by and identical visible image.

4,686,650

MONOLITHIC STORAGE DEVICE

Ryoichi Hori, Tokyo, and Kiyoo Ito, Higashikurume, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 564,497, Dec. 22, 1983, Pat. No. 4,611,299, which is a continuation of Ser. No. 351,225, Feb. 22, 1982, abandoned. This application Apr. 30, 1986, Ser. No. 857,302
Claims priority, application Japan, Feb. 27, 1981, 56-28109
Int. Cl.[4] G11C *13/00*
U.S. Cl. 365—189 **21 Claims**

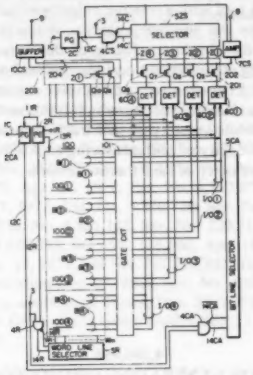
1. A memory, comprising:

a memory matrix comprised of a plurality of groups of memory cells, each group further comprising plural subgroups;

a plurality of common data lines, each corresponding to one of the groups;

first address means for simultaneously addressing a plurality of said subgroups, each addressed subgroup belonging to a different one of said groups, in response to a first address signal provided by an address line, said first address means not responding to a sequence of a second address signal which follows the first address signal;

second address means for simultaneously connecting a corresponding one of memory cells of each of the subgroups addressed by said first address means to a corresponding common data line in response to each of the sequences of the second address signals, said second address means not responding to the first address signal;



a plurality of detector means for simultaneously receiving and latching read-out signals, provided on said common data lines by memory cells accessed by said first address and second address means, said detector means repeating the receiving and latching of said read-out signals in synchronism with the sequential connection by the second address means based on the sequence of the second address signals; and

output means for sequentially outputting the read-out signals latched by said detector means, in synchronism with each latching operation of said detector means and selectively outputting the read-out signals latched by said detector means in response to a third address signal.

4,686,651

POWER SWITCHED READ-ONLY MEMORY

Bruce G. Armstrong, Belmont, and Fabio Principi, Cupertino, both of Calif., assignors to Raytheon Company, Lexington, Mass.

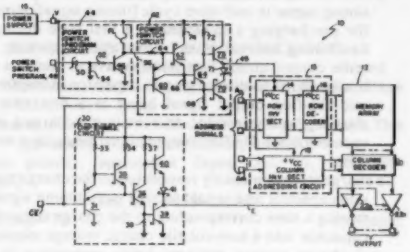
Filed Nov. 15, 1984, Ser. No. 671,710
Int. Cl.[4] G11C *8/00, 17/00*
U.S. Cl. 365—226 **4 Claims**

1. A memory integrated circuit component comprising:

(a) a memory;

(b) means for addressing the memory; and,

(c) means, programmable to either: (a) electrically couple or decouple the addressing means and a power supply selectively in accordance with an enable signal; or, (b) maintain



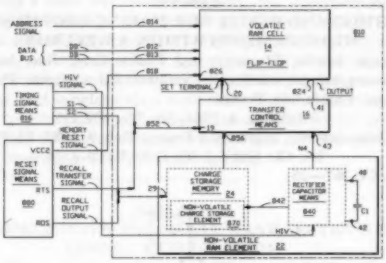
the addressing means electrically coupled to the power supply independent of the enable signal.

4,686,652

NON-VOLATILE RAM CELL WITH SINGLE HIGH VOLTAGE PRECHARGE

John R. Spence, Villa Park, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 25, 1985, Ser. No. 801,650
Int. Cl.[4] G11C *8/00*
U.S. Cl. 365—230 **11 Claims**



1. A memory cell circuit for storing the first or second state of a digital signal on a data bus in response to being addressed by an address signal on an address bus,

said memory cell having a store cycle each store cycle having a repeating series of recurring stored cycle sequences, each store cycle sequence having a (HIV) timing signal during a first timing interval, and first and second store timing signals during second and third timing intervals from a timing signals means for the control of said store cycle sequence;

said memory cell circuit also having a recall cycle, each recall cycle having a memory reset signal to pre-set the state of the memory cell circuit during a first reset signal interval, a recall output signal at a predetermined voltage level and RECALL TRANSFER signal in a second reset signal interval from a RESET SIGNAL MEANS to control a recall timing sequence, said memory cell comprising:

a volatile RAM cell having a flip-flop providing an output signal at an output terminal, said output signal being characterized to assume a first or second stable state corresponding to the state of the data bus in response to an address signal on the address bus,

said flip-flop also having a reset terminal responsive to said memory reset signal for forcing the flip-flop to assume a predetermined state in response to said memory reset signal and a set terminal responsive to a set signal for

setting the state of said volatile RAM cell in said recall timing sequence;

a non-volatile RAM element having:

a rectifier capacitor means responsive to said high voltage timing signal in said store cycle [timing signal] sequence for precharging a capacitor to a first state during the first timing interval of each store cycle sequence; and

transfer control circuit means responsive to said first store timing signal to discharge said capacitor in response to said flip-flop output signal being in a first state and allowing said capacitor to remain precharged in response to said flip-flop output signal being in a second state;

a charge storage memory responsive to the charge state of said capacitor and to said second store timing signal for storing a state corresponding to the charge state of said capacitor into a non-volatile charge storage element;

said charge storage memory being responsive to said recall output signal in said recall timing sequence to provide a set signal having a state corresponding to the stored state of said capacitor;

said transfer control circuit means being responsive to said RECALL TRANSFER signal to couple said set signal to said set terminal to set the state of said flip-flop during said recall timing signal sequence to state corresponding to the charged state of said non-volatile storage element;

whereby, said flip-flop provides, said output signal at its outpout terminal representing the charged state of said non-volatile charge storage element.

4,686,653

METHOD AND DEVICE FOR MAKING GEOPHYSICAL MEASUREMENTS WITHIN A WELLBORE

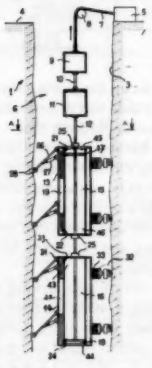
Philippe Staron, Mennecy, and Pierre Gros, Buc, both of France, assignors to Societe Nationale Elf Aquitaine (Production), Courbevoie, France

Filed Dec. 4, 1984, Ser. No. 678,119

Claims priority, application France, Dec. 9, 1983, 83 19727

Int. Cl.[4] G01V *1/00, 1/40;* **E21B** *4/18*

U.S. Cl. 367—25 **16 Claims**



1. A device for making geophysical measurements within a wellbore comprising:

drive means disposed at the ground surface;

traction means within the wellbore and operatively connected to said drive means so that said drive means controls continuous displacement of said traction means within the wellbore;

at least one double-acting jack having two moving portions, one of said moving portions being operatively associated with said traction means so that said one moving portion is displaced with said traction means, and the other of said moving poirtions is relatively movable with respect to said one moving portion so that said other of said moving portions is non-continuously displaceable with respect to said wellbore;

at least one measuring tool operatively associated with said other of said moving portions so that said at least one measuring tool is displaceable with said other of said moving portions; and

means for controlling the relative displacement between said two moving portions of said jack;

so that said traction means is displaced in continuous motion with the speed of displacement controlled by said drive means, said double-acting jack is adapted to provide the measuring tool with a relative velocity which is equal and opposite to the absolute velocity of traction means for reducing the absolute velocity of the measuring tool to zero during measurement periods, and said measuring tool is provided between two consecutive measurement periods with a relative velocity which is in the same direction as the absolute velocity of said traction means so that the absolute velocity of said measuring tool is higher than the absolute velocity of said traction means.

4,686,654

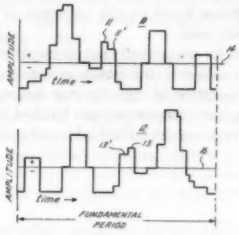
METHOD FOR GENERATING ORTHOGONAL SWEEP SIGNALS

Carl H. Savit, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex.

Filed Jul. 31, 1986, Ser. No. 891,475

Int. Cl.[4] G01V *1/22*

U.S. Cl. 367—41 **4 Claims**



1. A method for enhancing the orthogonality, with respect to each other, of at least two swept-frequency signals, while retaining common amplitude and phase spectra, comprising the steps of:

providing a first swept-frequency signal including a plurality of time periods within the duration of said first swept-frequency signal, each said time period including a set of asymmetrical pulses distributed in a first sequence as a function of time; and

providing at least a second swept-frequency signal including a plurality of time periods within the duration of said second swept-frequency signal that correspond to the time periods of said first signal, at least one of said time periods of said second swept-frequency signal including a set of asymmetrical pulses that are distributed as a function of time in a reverse sequence with respect to the pulse distribution within the corresponding fundamental period of said first swept-frequency signal.

4,686,655

FILTERING SYSTEM FOR PROCESSING SIGNATURE SIGNALS

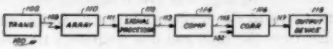
Gilbert P. Hyatt, P.O. Box 4584, Anaheim, Calif. 92803

Continuation-in-part of Ser. No. 160,872, Jun. 19, 1980, Pat. No. 4,491,930, and Ser. No. 860,257, Dec. 14, 1977, Pat. No. 4,371,923, said Ser. No. 160,872, is a continuation-in-part of Ser. No. 889,301, Mar. 23, 1978, Pat. No. 4,322,819, Ser. No. 860,278, Dec. 13, 1977, Pat. No. 4,471,385, Ser. No. 849,812, Nov. 9, 1977, Ser. No. 844,765, Oct. 25, 1977, Pat. No. 4,523,290, Ser. No. 812,285, Jul. 1, 1977, Pat. No. 4,371,953, Ser. No. 801,879, May 13, 1977, Pat. No. 4,144,582, Ser. No. 752,240, Dec. 20, 1976, abandoned, Ser. No. 754,660, Dec. 27, 1976, Pat. No. 4,486,850, Ser. No. 730,756, Oct. 7, 1976, abandoned, Ser. No. 727,330, Sep. 27, 1976, abandoned, Ser. No. 550,231, Feb. 14, 1975, Pat. No. 4,209,843, Ser. No. 522,559, Nov. 11, 1974, Pat. No. 4,209,852, Ser. No. 476,743, Jun. 5, 1974, Pat. No. 4,364,110, Ser. No. 490,816, Jul. 22, 1974, Pat. No. 4,029,853, Ser. No. 339,817, Mar. 9, 1973, Pat. No. 4,034,276, Ser. No. 366,741, Jun. 4, 1973, Pat. No. 3,986,922, Ser. No. 325,941, Jan. 22, 1973, Pat. No. 4,060,848, Ser. No. 302,771, Nov. 1, 1972, Ser. No. 291,394, Sep. 22, 1972, Pat. No. 4,396,976, Ser. No. 288,247, Sep. 11, 1972, Pat. No. 4,121,284, Ser. No. 246,867, Apr. 24, 1972, Pat. No. 4,310,878, Ser. No. 232,459, Mar. 7, 1972, Pat. No. 4,370,720, Ser. No. 230,872, Mar. 1, 1972, Pat. No. 4,531,182, Ser. No. 229,213, Apr. 13, 1972, Pat. No. 3,820,893, Ser. No. 135,040, Apr. 19, 1971, Ser. No. 134,958, Apr. 19, 1971, and Ser. No. 101,881, Dec. 28, 1970. This application Sep. 27, 1982, Ser. No. 425,131

Claims priority, application Japan, Dec. 28, 1971, 47-3974

Int. Cl.[4] G01V *1/00*; G06J *1/00*; G06F *15/34*

U.S. Cl. 367—59 47 Claims



1. An acoustic filtering system comprising:

a plurality of signature signal generators being spaced apart, each signature signal generator generating an overlapping signature signal that is overlapping the signature signal generated by at least one of the other spaced apart signature signal generators, each signature signal having a signature that is different from the signature of the signature signal of each of the other spaced apart signature signal generaors for propagating through a propagation medium and

a signature signal processor being spaced apart from each of said plurality of signature signal generators for generating output signal samples in response to the overlapping signature signals propagating through said propagation medium from said plurality of signature signal generators, said signal processor including

(a) a receiver for generating input signature signal samples in response to the overlapping signature signals propagating through said propagation medium from said plurality of signature signal generators,

(b) a plurality of reference signal generators each corresponding with a different one of said signature signal generators in said plurality of signature signal generators and each generating reference signal samples having a signature that is different from the signature of the reference signal samples generated with each of the other reference signal generators and each having a signature that is the same as the signature of the overlapping signature signal generated with the corresponding one of said plurality of signature signal generators, and

(c) a plurality of filter processors each corresponding with a different one of said reference signal generators in said plurality of reference signal generators and each generating output signal samples by filter processing the input signature signal samples generated with said receiver in response to the reference signal samples generated with the corresponding one of the reference signal generators.

4,686,656

SUPPLEMENTARY LIGHT DEVICE FOR MOTORCYCLES

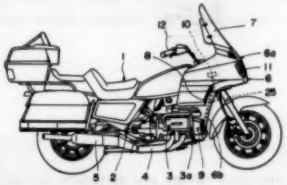
Kazuo Morishima, Shiki, Japan, assignor to Honda Giken Kogyo K.K., Tokyo, Japan

Continuation of Ser. No. 756,026, Jul. 17, 1985, abandoned. This application Sep. 18, 1986, Ser. No. 908,891

Claims priority, application Japan, Jul. 19, 1984, 59-109153[U]

Int. Cl.[4] F21V *33/00*

U.S. Cl. 362—72 10 Claims



1. A supplementary light device for use with a motorcycle of the type having a main frame structure, a fairing covering at least front and front lower areas of the main frame structure and having a front face and a bifurcated and depending part extending downwardly on either side of the main frame structure, and a headlight provided at said front face of said fairing, said fairing having a ventilator opening in said bifurcated and depending part thereof and located at a lower level than said headlight, said supplementary light device comprising means adapted to incorporate said supplementary light device integrally in said bifurcated and depending part of said fairing at a location lower than said ventilator opening.

4,686,657

MATCHING P WAVE AND SHEAR WAVE SECTIONS IN SEISMIC EXPLORATION

J. A. Dellinger; Neal R. Goins, and Theresa A. Reilly, all of Dallas, Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 653,616, Sep. 24, 1984, abandoned. This application Jan. 3, 1985, Ser. No. 688,656

Int. Cl.[4] G01V *1/36*

U.S. Cl. 367—75 20 Claims

1. The method of determining the ratio of the velocities of compressional and shear waves in seismic exploration comprising:

recording compressional and shear wave seismic traces representing the reflection of seismic energy from subsurface formations;

cross-correlating a window of one of said compressional and shear wave siesmic traces against a window of the other to produce a first set of correlation coefficients as a function of time;

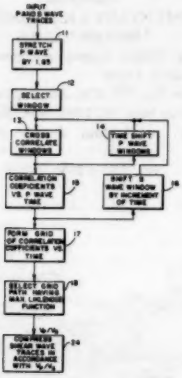
time shifting said window through a plurality of time increments;

repeating the step of cross-correlating for each of said plurality of time increments to produce a plurality of additional sets of correlation coefficients as a function of time;

plotting said first and plurality of additional sets of correlation coefficients in parallel columns as a function of time to provide a two dimensional grid, each point on said grid being the correlation coefficient between a point on one trace cf said compressional and shear wave seismic traces and a point on the other of said traces;

determining a likelihood function along a plurality of paths,

said likelihood function representing the correlation coefficients at the points along each of said paths, each of said paths representing different profiles of the ratios of compressional and shear wave velocities; and



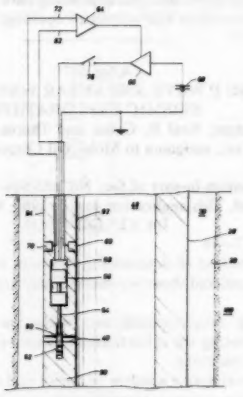
selecting the path having the maximum likelihood function as indicating the correct ratio ofthe velocities of compressional and shear waves.

4,686,658

SELF-ADJUSTING VALVE ACTUATOR

Francis L. Davison, Houston, Tex., assignor to NL Industries, Inc., New York, N.Y.

Filed Sep. 24, 1984, Ser. No. 654,188
Int. Cl.[4] G01V *1/137*; F16K *31/02*
U.S. Cl. 367—85 **17 Claims**



1. A method for transmitting signals through a fluid comprising:

maintaining said fluid under pressure;

obtaining a value characteristic of the minimum force necessary to actuate a valve means in communication with said fluid at a first location;

adjusting in response to said value the actuating force applied to said valve means;

actuating said valve means with said minimum actuating force to impart a pressure pulse to said fluid at said first location; and

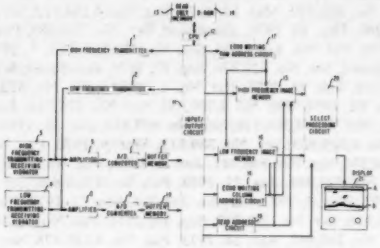
detecting said pressure pulse in said fluid at a second location.

4,686,659

COLOR SONAR SYSTEM FOR DISPLAYING ECHO SIGNALS FROM FISH

Shigeo Yamamoto, Aichi, Japan, assignor to Keisuke Honda, Aichi, Japan

Filed Jun. 14, 1985, Ser. No. 745,264
Int. Cl.[4] G01S *15/96*, *7/62*
U.S. Cl. 367—87 **5 Claims**



1. A color selector comprising:

CPU means for producing trigger signals;

high and low frequency transmitters for transmitting high and low frequency output pulse signals in response to said trigger signals;

high and low frequency transmitting - receiving vibrators for transmitting high and low frequency ultrasonic waves in response to the high and low frequency output pulse signals from the high and low frequency transmitters and for receiving high and low frequency echoes; amplifiers for amplifying the high and low frequency echo signals received by the high and low frequency transmitting - receiving vibrators;

A/D converters for converting the high and low frequency echo signals amplified by the amplifiers to high and low frequency digital echo signals;

a buffer memory for storing the high and low frequency digital echo signals from the A/D converters;

A D - RAM for storing the high and low frequency digital echo signals from the buffer memory in response to a group of at least one trigger signal from the CPU means;

an echo writing raw address circuit for designating a raw address to the high and low frequency digital echo signals stored in the D - RAM;

an echo writing column address circuit for designating a column address to the high and low frequency digital echo signal;

high and low frequency image memories respectively storing the high and low frequency digital echo signals by the address signals from the echo writing raw address circuit and the echo writing column address circuit;

a select processing circuit for producing predetermined color signals when differences between the levels of the high and low frequency digital echo image signals, which are respectively read from the high and low frequency image memories, are within a predetermined value range, and for producing color signals corresponding to the levels of the one of the high and low frequency digital echo image signals when the differences between the levels of the high and low frequency digital echo image signals are outside the predetermined value range; and

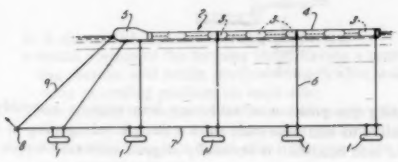
a cathode ray tube for displaying the predetermined color signals or the color signals corresponding to the levels of the digital echo image signals.

4,686,660

ASSEMBLY FOR USE IN SEISMIC SURVEYS OF THE SEA BED

Einar Gjestrum, Boverbru; Inge Dragsund, Ulsteinvik; Just Skog, Farsund, and Svein Selvag, Tjorvag, all of Norway, assignors to Geophysical Company of Norway A/S, Hovik, Norway

Continuation of Ser. No. 439,769, Nov. 8, 1982, abandoned. This application Jan. 9, 1986, Ser. No. 816,996
Claims priority, application Norway, Nov. 25, 1981, 814005
Int. Cl.[4] B63B *21/66*; G01V *1/00, 1/38*
U.S. Cl. 367—153 7 Claims



1. In a seismic survey system for making seismic surveys of the sea bed, wherein seismic signal transmitters are connected to each other by a transmitter line in relative spaced relationship and are towed behind a vessel by a tow line and are supported by and suspended below the surface of the water from at least one float body, the improvement comprising:

each float body comprises an elongated, flexible, substantially straight tubular sleeve member having a forward end and a rear end, said seismic signal transmitters being air guns;

a plurality of discrete float members disposed in longitudinal spaced relationship within said tubular sleeve member, and

a head member having a forward end, a rear end, a streamlined configuration and at least at said forward end of said head member a larger cross-section than said tubular sleeve member adapted to minimize drag through the water attached at the rear end thereof to the forward end of said tubular sleeve member;

a connecting line attached at one end to the front end of said head member; and

a coupling point disposed forward of said front end of said head member and at the same depth as said transmitters for coupling the transmitter line and the other end of said connecting line to the tow line of the vessel.

4,686,661

INFORMATION PROCESSING APPARATUS USED IN A MAGNETO-OPTICAL INFORMATION RECORDING-REPRODUCING APPARATUS AND HAVING IMPROVED ERASING CAPABILITY

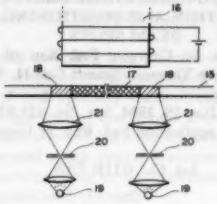
Kazuo Isaka, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1984, Ser. No. 620,808
Claims priority, application Japan, Jun. 23, 1983, 58-111810
Int. Cl.[4] G11B *5/024, 5/127, 11/10*
U.S. Cl. 369—13 5 Claims

1. An information processing apparatus for erasing information recorded on a magneto-optical recording medium in a magneto-optical information recording-reproducing system, said magneto-optical recording medium having a magnetic film with an intrinsic coercivity on which information is recorded by a variation in direction of magnetization, said apparatus comprising:

magnetic field producing means for applying an extraneous magnetic field to a partial area of the magneto-optical recording medium, said extraneous magnetic field being greater than said intrinsic coercivity of said magnetic film; and

means for applying a light beam to a boundary portion of said partial area of the recording medium to heat said



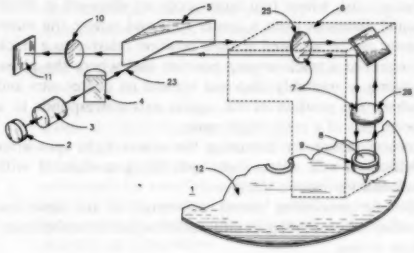
magnetic film to about its curie point in said boundary portion to ensure complete erasure thereof.

4,686,662

SUBAPERTURE COARSE TRACKING OPTICAL SYSTEM FOR OPTICAL DATA STORAGE DEVICES

James W. Baer, Boulder, Colo., assignor to Storage Technology Partners II, Louisville, Colo.

Filed Jul. 16, 1984, Ser. No. 631,277
Int. Cl.[4] G11B *7/095*
U.S. Cl. 369—44 4 Claims



1. An optical system for preventing light reflected by a protective layer on an optical recording structure, in an optical disk information storage unit having coarse servo tracking, from, interfering with light reflected from an active layer of the optical disk recording structure, said optical system comprised of;

a means for emitting a collimated, coherent coarse servo light beam so as to emit a beam along a first optical path parallel to but off-center from the optical axis of an objective lens;

a means for expanding one optical axis of the incident light beam so as to form a line focus beam on the disk surface;

a means for spatially separating the beams reflected from the protective layer and the active layer;

a means for splitting the incident beam from any beams reflected from the disk surface.

a means for translating the coarse servo beam over the disk surface for coarse servo tracking;

a means for relaying the coarse beam to the coarse servo translating means;

an objective lens for focusing the coarse servo beam on the disk surface,;

a means for focusing any beams reflected from the disk surface onto a coarse serve detector, and;

a coarse servo beam detector.

4,686,663

TRACK FOLLOWER SYSTEM EMPLOYING AN OPTICAL SCANNER WITH AUTOMATIC CONTROL OF A ROTATABLY MOVABLE PHASE GRATING USED FOR THE GENERATION AND POSITIONING OF READ BEAM SPOTS

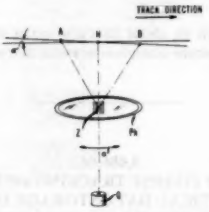
Hans-Robert Kühn, St. Georgen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany

Filed Jun. 25, 1984, Ser. No. 623,971

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1983, 3323007

Int. Cl.[4] G11B *7/09*

U.S. Cl. 369—46 **19 Claims**



1. A radially acting track follower device comprising

a light source generating a light beam;

a rotatable phase grating disposed in a path of the light beam and generating three light spots disposed about a line on a record disk where two outer spots are disposed at about equal distances from a center spot and where the outer spots can be adjusted in their position relative to a track tangent at a track sensing position and where the phase grating is rotatably disposed around its center axis and where the position of the center axis corresponds to a beam axis of a center light spot;

detection means for detecting the center light spot after reflection, said center light spot being modulated with information from a track;

electronic processing means connected to the detection means for processing an information signal from the detection means;

separate detection means for detecting reflected light bundles of the outer spots;

control means connected to the separate detection means to provide control and automatic adjustment signals for a radial track follower device; and

electromechanical device means connected to the control means to provide an angular rotation of the phase grating around its center axis.

4,686,664

TONE ARM ASSEMBLY

Robert Graham, Phillips Academy, Andover, Mass. 01810

Continuation of Ser. No. 488,183, Apr. 25, 1983, Pat. No. 4,587,646, which is a continuation of Ser. No. 287,958, Jul. 29, 1981, abandoned, which is a continuation-in-part of Ser. No. 67,264, Aug. 17, 1979, abandoned. This application May 5, 1986, Ser. No. 859,479

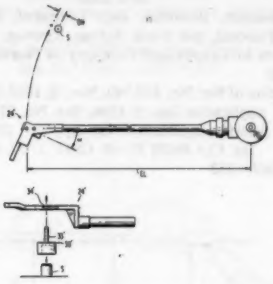
Int. Cl.[4] G11B *3/10*

U.S. Cl. 369—55 **4 Claims**

1. A method of installing a pivoting tone arm and associated support assembly on a turntable support assembly such that a stylus mounted on said tone arm is properly aligned relative to revolving turntable, comprising the following steps:

fixedly attached a tone arm support assembly base plate to a surface of said turntable support assembly,

pivoting said tone arm into vertical alignment with an alignment nipple removably mounted on a spindle extending from the turntable; and



adjusting the position of said tone arm support assembly relative to said base plate until a designated opening in a tone arm headshell is vertically aligned with said nipple.

4,686,665

MODE SWITCHING DEVICE IN A DISC PLAYBACK DEVICE

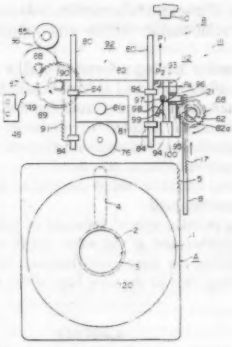
Yasuhiko Kamoshita, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Sep. 6, 1985, Ser. No. 773,304

Claims priority, application Japan, Sep. 14, 1984, 59-139851[U]

Int. Cl.[4] G11B *1/00, 17/04*

U.S. Cl. 369—77.2 **5 Claims**



1. A mode switching device in a disc playback device comprising:

loading means for transferring a disc or a case housing a disc between an eject position in which the disc or the disc case is inserted and ejected and a playback position in which the disc can be played, thereby to load or eject the disc during a loading mode or eject mode, respectively;

feed means for feeding a pickup head which reads data recorded on the disc in a playback mode in a radial direction of the disc set in the playback position, wherein there is an overstroke region extending radially outwardly of an outermost read-out position of the pickup head, wherein the feed means is capable of moving across the overstroke region; and

mode switching means for performing switching of mode between the loading and playback modes and between the playback and eject modes when the feed means has reached a predetermined position in the overstroke region.

4,686,666

FLEXIBLE MICRO DISK

Harry N. Dieffenbach, Fremont, Calif., assignor to dcTEQ, Fremont, Calif.

Filed Jun. 27, 1986, Ser. No. 879,486

Int. Cl.[4] G11B *5/82, 23/00*

U.S. Cl. 369—290 **10 Claims**

1. A micro disk for data storage comprising:

a media portion of flat circular shape having a central opening therein, said media portion being flexible with a magnetic recording medium on each side;

a hub portion having a central axis, said hub portion including means for supporting the media portion adjacent the central opening in a radial plane relative to the hub portion central axis; an

coupling means by which the hub portion can be axially positioned, radially centered, and rotated, said coupling means being spaced axially of the hub portion from the media support means and projecting radially of the central axis by a greater dimension than the radial projection of the media support means;

whereby the media portion extends unsupported radially outward from the media support means beside the coupling means and there beyond so that the media portion beyond the coupling means is flexible.

4,686,667

BROADBAND INTEGRATED SUBSCRIBER LOOP SYSTEM

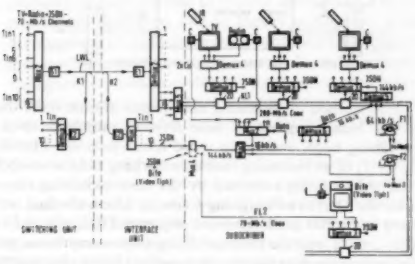
Horst Ohnsorge, Freiberg A.N., Fed. Rep. of Germany, assignor to Standard Electrik Lorenz AG, Stuttgart, Fed. Rep. of Germany

Filed Feb. 1, 1985, Ser. No. 697,314

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1984, 3403659

Int. Cl.[4] H04B *9/00*

U.S. Cl. 370—4 **4 Claims**



1. A broadband communications system for providing a plurality of telecommunications services in each direction of transmission between a switching unit and a plurality of subscribers grouped in a selected location, said broadband communications system comprising:

a plurality of channels at said switching unit, each of said plurality of channels for providing a plurality of differing telecommunications services to respective ones of said plurality of subscribers, each of said plurality of channels being assigned to a particular one of said plurality of subscribers and each of said plurality of subscribers being assigned to at last one of said plurality of channels;

means at said switching unit for multiplexing said plurality of channels into an associated channel assigned to said selected location, said means for multiplexing employing digital, time-division multiplexing techniques to combine signal information from each of said plurality of channels on a timedivision multiplex basis in said associated channel;

means at said switching unit for converting said combined signal information on said associated channel into an optical signal and optically transmitting said optical signal over a single optical waveguide to said selected location;

means at said selected location for converting said optical signal on said single optical waveguide into an electrical signal corresponding to said combined signal information on said associated channel;

means at said selected location for demultiplexing said electrical signal into a plurality of telecommunication service channels, each telecommunication service channel providing a plurality of differing telecommunications services and corresponding respectively to each of said plurality of channels at said switching unit;

means at said selected location for multiplexing a plurality of telecommunications service channels associated with a particular one of said plurality of subscribers into a time division multiplex signal and transmitting said time division multiplex signal to a site at which said particular subscriber is located;

tap means at said site for providing portions of said time division multiplex signal to individual use locations;

demultiplexer means at said site for separating said portions of said time division multiplex signal from said tap means into at least individual ones of said telecommunications service channels associated with a particular subscriber and individual ones of said plurality of differing telecommunications services for use at said individual use locations;

means at said site for receiving telecommunication signals from said individual use locations and combining said telecommunication signals received into a single signal on a time division multiplex basis;

means at said selected location for assembling on a time division multiplex basis a plurality of said single signals, said means for assembling producing a digital backchannel signal to be transmitted to said switching unit containing back-channel information associated with each of said plurality of subscribers;

means at said selected location for converting said digital back-channel signal into a back-channel optical signal and optically transmitting said back-channel optical signal to said switching unit; and

means at said switching unit for receiving said back-channel optical signal and converting said back-channel optical signal into a plurality of subscriber back-channel signals, each of said plurality of subscriber back-channel signals corresponding to one of said plurality of single signals and being associated with an individual one of said plurality of subscribers.

4,686,668

LOOPBACK OF A PCM SIGNAL WITH LOOPBACK COMMAND SIGNAL BITS PLACED IN EACH FRAME OF THE SIGNAL AS PREDETERMINED ONES OF OVERHEAD BITS

Toshikazu Koseki, and Shigeaki Saito, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed May 6, 1985, Ser. No. 730,900

Claims priority, application Japan, May 8, 1984, 57-90126

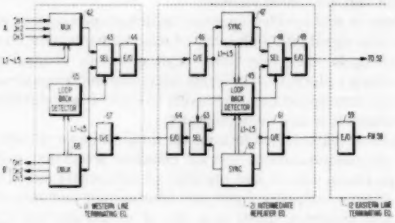
Int. Cl.[4] H04J *1/16*

U.S. Cl. 370—15 **5 Claims**

1. A loopback command arrangement for use in a first line terminating station of a pulse code modulation communication network comprising a first and a second transmission route and at least one intermediate repeater station and a second line

terminating station along said first and said second transmission routes, said first line terminating station including frame processing means for multiplexing input signals and transmission overhead bits into successive frames of a first pulse code modulated signal for delivery to said first transmission route and for demultiplexing successive frames of a second pulse code modulated signal received from said second transmission route into output signals and reception overhead bits, wherein the improvement comprises:

signal producing means coupled to said first line terminating station for producing a loopback command signal having a predetermined number of loopback command signal bits



for each frame of said first pulse code modulated signal to indicate said at least one intermediate repeater station which should loop back said first pulse code modulated signal as at least a part of said second pulse code modulated signal and said second line terminating station which should not loop back said first pulse code modulated signal; and

signal multiplexing means for making said frame processing means multiplex said loopback command signal in the successive frames of said first pulse code modulated signal with said loopback command signal bits placed in each frame of said first pulse code modulated signal as predetermined ones of the transmission overhead bits.

4,686,669

PATH HUNTING IN A DISTRIBUTED CONTROL SWITCHING SYSTEM

Shih-Jeh Chang, Naperville, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 7, 1985, Ser. No. 699,465

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—54 **41 Claims**

1. In a switching system comprising

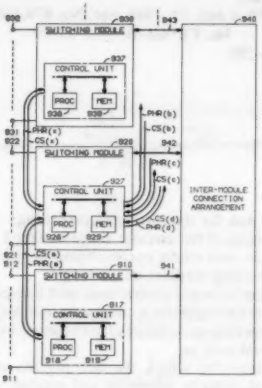
a plurality of switching modules each for communicating in a plurality of channels associated with that module and

inter-module connection means for providing switched connections among said modules such that each of said channels associated with any given one of said modules can be connected with a corresponding one of said channels associated with any other one of said modules,

a method of establishing a communication path between any first one and any second one of said modules comprising

said first module transmitting to said second module a message defining available ones of said channels associated with said first module,

said second module selecting an available one of said channels associated with said second module that corresponds to one of said channels defined by said message and



said inter-module connection means connecting said selected channel associated with said second module and the corresponding channel associated with said first module.

4,686,670

METHOD OF SWITCHING TIME SLOTS IN A TDM-SIGNAL AND ARRANGEMENT FOR PERFORMING THE METHOD

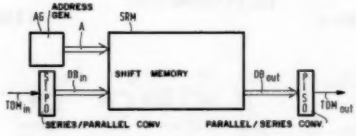
Jozef L. W. Kessels, and Alphons A. M. L. Bruekers, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 7, 1985, Ser. No. 785,315

Claims priority, application Netherlands, Jul. 15, 1985, 8502023

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—68 **4 Claims**



1. A method of switching data words in time slots, the data words being applied in time-division multiplex to a time switching stage, and a data word I_s in a time slot s (s=0, 1, 2, ..., n−1) of an incoming frame comprising n data words I_s in n time slots s being switched by the time switching stage to a time slot D(s) in an outgoing frame in which the data words I_s have any other predetermined sequence D(s), where D(s)=0, 1, 2, ... n−1, and the time switching stage comprises a memory for storing the data words, such method being characterized in that it comprises the following steps:

(i) the data word I_s in an incoming time slot s is entered in the memory at an address A(s) which is equal to the number of outgoing time slots D_j for which j is less than s and for which D(j) exceeds D(s);

(ii) The data word already stored in the memory location having the address determined in step (i) and also the data words present in memory locations having an address higher than the address determined in step (i) are each shifted to the next higher address; and

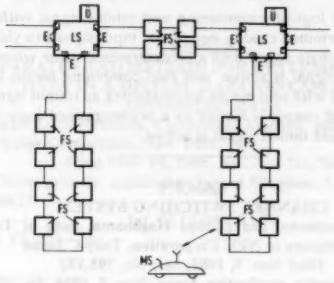
(iii) the data words present in memory locations having an address lower than the address determined sub (i) are maintained without change in the original address.

4,686,671

CELLULAR COMMUNICATION SYSTEM OPERABLE WITH TRANSMISSION PATHFAULT

Theodor Burian, Weil der Stadt, and Herbert Siegel, Ditzingen, both of Fed. Rep. of Germany, assignors to Standard Elektrik Lorenz AG, Stuttgart, Fed. Rep. of Germany

Filed Mar. 22, 1985, Ser. No. 715,146
Int. Cl.[4] H04J 3/00; H04Q 7/04
U.S. Cl. 370—88 5 Claims



1. A communications system including a plurality of control stations, a plurality of fixed stations and a plurality of mobile stations capable of communicating with selected ones of said plurality of fixed stations by radio, said communications systems being divided into cells each cell containing a control station and at least two fixed stations controlled by that control station, at least one of said plurality of control stations being colocated with an interface facility for providing connection of said at least one of said plurality of control stations to an automatic telephone network, and said plurality of control stations being interconnected by interconnecting transmission paths, the improvement in said communications system comprising:

a plurality of closed transmission paths, each of said plurality of closed transmission paths being connected to an associated one of said plurality of control stations and each of said plurality of closed transmission paths beginning and ending at a predetermined one of said plurality of control stations associated therewith;

means for connecting each of said plurality of fixed stations to one of said transmission paths to enable each of said plurality of fixed stations to receive intelligence and control signals therefrom and to impart intelligence signals thereto, each of said transmission paths being bidirectional and having a predetermined number K of time-division multiplex channels provided for intelligence signals and a predetermined number L of separate time-division multiplex channels provided for control signals in each direction;

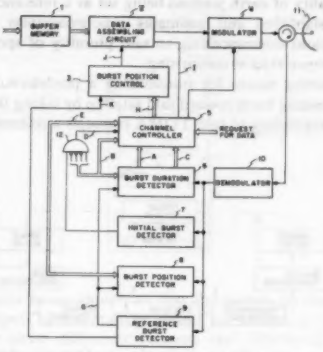
means for assigning the control of fixed stations connected to said interconnecting transmission paths interconnecting at least first and second ones of said plurality of control stations in such manner that each of said first and second control stations controls communications from and to those fixed stations located on said interconnecting transmission paths nearest it, and for communication between one of said first and second control stations and the fixed stations controlled thereby and between another of said first and second control stations and the fixed stations controlled thereby, the occupation of said predetermined number K of channels begins at a first channel, while for direct communication between said first and second control stations the occupation of the K channels begins at channel K, and further channels are occupied in a continuous sequence, incrementally for said communications with said fixed stations, and decrementally for said direct control station communication.

4,686,672

TDMA COMMUNICATIONS APPARATUS HAVING ADAPTIVE BURST DURATION

Junji Namiki, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Oct. 10, 1984, Ser. No. 659,567
Claims priority, application Japan, Oct. 13, 1983, 58-191492; Oct. 13, 1983, 58-191493
Int. Cl.[4] H04J 3/16, 3/06
U.S. Cl. 370—95 8 Claims



1. A time division multiple access (TDMA) communications system for enabling each of a plurality of stations served by said system to adaptively vary its own burst duration in a TDMA frame in response to their own instantaneous communications traffic needs, said system comprising:

transmit buffer memory means for temporarily storing data to be transmitted;

data assembling means coupled to said buffer memory means for assembling an output of said transmit buffer memory means into a predetermined burst format;

burst position control means coupled to control said data assembly means for shifting said assembled burst to a desired position in said TDMA frame;

transmitting means for transmitting said assembled burst into said format to a satellite;

receiving means for receiving all the bursts contained in said TDMA frames;

burst duration detector means coupled to an output of said receiving means for determining a duration of all of said received bursts and a duration of a burst at the head of said TDMA frame;

detector means for detecting when said transmitted burst is at the head of said TDMA frame; and

channel controller means responsive to an output of said detector means and to an output of the burst duration detector means for causing the burst position control means to shift said transmitted burst at each predetermined period of time while causing the burst assembling device to vary the duration of said transmitted burst.

4,686,673

SYNCHRONIZING BURST TRANSMISSION PHASE CONTROL SYSTEM

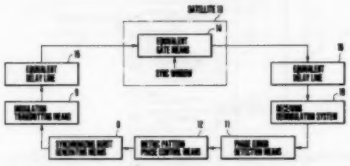
Toshinori Hotta, c/o NEC Corporation, 33-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Filed Feb. 11, 1985, Ser. No. 700,512
Claims priority, application Japan, Feb. 15, 1984, 59-26372; Apr. 10, 1984, 59-71268
Int. Cl.[4] H04J 3/06
U.S. Cl. 370—104 6 Claims

1. A synchronizing burst transmission phase control system for use in a satellite communication system based on a space

division multiple access/satellite switching-time division multiple access (SDMA/SS-TDMA) scheme utilizing a plurality of spot beams corresponding to up and down links and having a communication satellite which switches line connections between said up and down links in a predetermined connection mode with a predetermined TDMA frame period, and produces a sync window and a plurality of data windows on the basis of a predetermined reference time in said satellite, and a plurality of earth stations intercommunicating via said satellite through a time division multiplexed connection, at least one of said plurality of earth stations being set as a reference station which establishes and maintains synchronization between earth stations corresponding to said plurality of spot beams, said reference station comprising:

transmitting means for transmitting a predetermined synchronizing burst toward said satellite by taking the period corresponding to said TDMA frame as a reference;



receiving means for receiving the synchronizing burst transmitted by said transmitting means and returned from said satellite through said sync window;

first means responsive to the synchronizing burst received by said receiving means, for measuring a symbol length of a metric pattern which has passed through said synch window and is received correctly, and to compare the measured symbol length with a predetermined reference symbol length to thereby determine a transmission timing error;

second means responsive to an output of said first means for controlling a transmission timing of the synchronizing burst; and

third means for switching a symbol length of the metric pattern to be supervised in accordance with a synchronous state of said synchronizing burst.

4,686,674

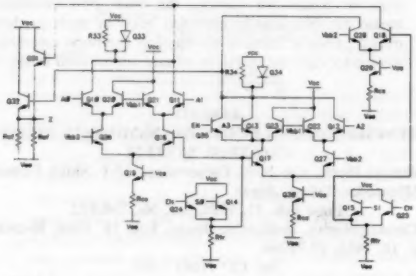
MULTIPLEXER WITH INHIBIT FOR ECL GATE ARRAY

Nim C. Lam, Sunnyvale, Calif., assignor to Fairchild Semiconductor, Cupertino, Calif.

Filed Dec. 12, 1985, Ser. No. 807,929

Int. Cl.[4] H04J *3/04;* **H03K** *17/76*

U.S. Cl. 370—112 **4 Claims**



1. A multiplexer comprising:

means for receiving plural input signals;

means for receiving a select signal set including at least one select signal;

means for producing an output signal as a function of one of said input signals, said one of said input signals being selected according to the value of said select signal set;

means for receiving an inhibit signal;

means for logically combining said inhibit signal with said select signal set so that a predetermined exactly one of said input signals is selected when said inhibit signal is active; and

means for logically combining said inhibit signal with said predetermined exactly one of said input signals to yield an intermediate signal with a predetermined value when said inhibit signal is active, said two combining means being coupled with said means for producing an output signal so that said output is forced to a predetermined logic level when said inhibit signal is active.

4,686,675

CHANNEL SWITCHING SYSTEM

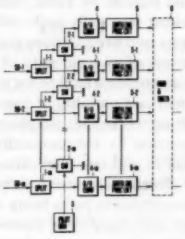
Hideaki Morimoto, and Hiromi Hashimoto, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Nov. 5, 1985, Ser. No. 795,132

Claims priority, application Japan, Nov. 5, 1984, 59-232711

Int. Cl.[4] G06F *11/20;* **H04L** *1/02*

U.S. Cl. 371—8 **4 Claims**



1. A channel switching system in a digital radio transmission circuit having at least one regular channel and a standby channel, each channel being arranged to transmit a digital multiplexed signal including a data signal of N (N is an integer of not less than (1) strings, said channel switching system having a transmitting side for transmitting the data signal and a receiving side for receiving the data signal transmitted from the transmitting side, said receiving side of the channel switching system, comprising:

receiving signal supply means for supplying to said regular channel and data signal received through said standby channel in accordance with a circuit failure of a given regular channel;

signal frequency-dividing means for N frequency-dividing a data signal received through said regular channel and the data signal supplied from said received signal supply means and generating N signal strings;

signal order changing means for receiving the N signal strings from said signal frequency-dividing means, the signal strings respectively corresponding to said regular and standby channels, for changing an order of a signal string within the N signal strings corresponding to said regular and standby channels in response to different control signals, and for generating output N signal strings of said regular and standby channels;

comparing means for comparing bits of the N signals strings of said regular and standby channels which are generated by said signal order changing means, to output a concidence signal or a noncoincidence signal when a result of the comparison represents a coincidence of a noncoincidence, respectively, said noncoincidence signal being

supplied to said signal order changing means as said control signal;

hitless signal switching means for receiving the N signal strings from said signal order changing means and generating a selected one of the N signal strings of said regular and standby channels in accordance with the coincidence signal from said comparing means; and

frequency multiplying means for receiving and multiplying with N an output from said hitless signal switching means, and generating an N-multiplied signal.

4,686,676

APPARATUS AND METHOD FOR DETERMINING TRUE DATA IN A DIGITAL DATA STREAM FROM DISTORTED DATA

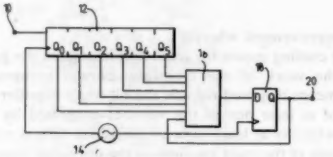
Andrew D. McPherson, Cambridge, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 14, 1985, Ser. No. 711,783

Claims priority, application United Kingdom, Mar. 14, 1984, 8406627

Int. Cl.[4] G06F *11/00*

U.S. Cl. 371—36 **11 Claims**



1. A method of estimating true data from a distorted data signal having a given frequency comprising the steps of:

(a) successively sampling the distorted digital data signal at a clock frequency greater than the frequency of said distorted digital data signal;

(b) holding a plurality of n successive samples derived from the sampling step, said n successive samples having an order from longest to shortest time held;

(c) applying the n successive samples to n inputs of a majority logic circuit having (n+1) inputs;

(d) feeding back to the (n+1)st input of said majority logic circuit an output signal of said majority logic circuit, said output signal of said majority logic circuit, when received at said (n+1)st input, representing an immediately preceding decision of said majority logic circuit;

(e) discarding at least one longest held sample from said n successive samples;

(f) holding at least one next successive sample from said sampling step; and

(g) repeating steps c–f;

(h) whereby said output signal of said majority logic circuit is used during each repetition of step (d) to successively determine a majority decision for each succeeding plurality of n successive samples.

4,686,677

APPARATUS AND METHOD FOR DETECTING TIME-RELATED FAULTS

Laurence P. Flora, Covina, Calif., assignor to Unisys Corporation, Detroit, Mich.

Filed Aug. 2, 1985, Ser. No. 761,989

Int. Cl.[4] G06F *11/00*; H03K *5/26*

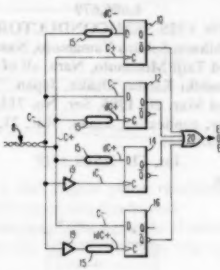
U.S. Cl. 371—61 **10 Claims**

1. Fault detection means comprising:

differential signal means providing a pair of differential digital signals;

a plurality of bistable means each having a data input, a clock input and at least one output, each bistable means being operative in response to a predetermined change in a signal applied to its clock input to provide a signal at its output indicative of the logical level of the signal applied to its data input when said predetermined change occurs;

coupling means coupling said pair of differential digital signals to the clock and data inputs of each bistable means such that the differential signal applied to one input is delayed by a predetermined amount and in a predetermined direction relative to the differential signal applied to the other input, the coupling provided by said coupling



means being chosen so that the signals produced at the outputs of said bistable means are indicative of whether the phase difference between said differential signals is within prescribed limits determined by said predetermined amount and said predetermined direction; and

logical circuit means to which the outputs from said bistable means are applied for producing a fault signal when the phase difference between said differential signals exceeds said prescribed limits.

4,686,678

SEMICONDUCTOR LASER APPARATUS WITH ISOLATOR

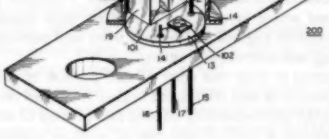
Yoshinori Ohta; Isamu Sakuma; Taketoshi Hibiya, and Mitsuhito Sakaguchi, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Mar. 25, 1985, Ser. No. 715,954

Claims priority, application Japan, Mar. 27, 1984, 59-43469[U]; Mar. 27, 1984, 59-43470[U]; Sep. 7, 1984, 59-135758[U]; Oct. 5, 1984, 59-151068[U]

Int. Cl.[4] H01S *3/00*

U.S. Cl. 372—33 **9 Claims**



1. A semiconductor laser apparatus with an optical isolation function comprising:

a semiconductor laser diode;

means for mounting said semiconductor laser diode;

a casing with a window through which oscillation light from said semiconductor laser diode passes, for hermetically sealing said semiconductor laser diode;

a magneto-optical member, provided between an end face of said semiconductor laser diode and said window, and having spontaneous magnetization oriented in the direction of said oscillation light transmission, for polarizing

oscillation light that is reflected back to said laser diode through said window at 90° with respect to said oscillation light that passes through said window from said laser diode; and

means for applying a magnetic field in the direction of said oscillation light transmission in a manner to saturate the spontaneous magnetization of said magneto-optical member.

4,686,679

WINDOW VSIS SEMICONDUCTOR LASER

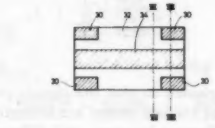
Seiki Yano, Kashihara; Saburo Yamamoto, Nara; Hiroshi Hayashi, Kyoto, and Taiji Morimoto, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

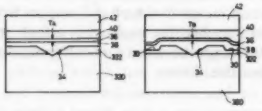
Filed Mar. 20, 1985, Ser. No. 713,832

Claims priority, application Japan, Mar. 21, 1984, 59-55048; Mar. 21, 1984, 59-55049

Int. Cl.[4] H01S *3/19*

U.S. Cl. 372—48 **9 Claims**





1. A semiconductor element in a window VSIS semiconductor laser, comprising:

a substrate;

a first semiconductor layer disposed on said substrate

a V-shaped groove formed in said semiconductor layer,

an active layer disposed above said first semiconductor layer, including that region of said first semiconductor layer in which said V-shaped groove is formed;

a stimulated region including a portion of each of said substrate, said first semiconductor layer having said V-shaped groove and said active layer; and

a pair of window regions, one window region formed at each end of said stimulated region and each window region including a portion of said substrate, said first semiconductor layer having said V-shaped groove and said active layer wherein said portions constituting said window regions are distinct from said portions constituting said stimulated region;

wherein at least one edge of said portion of said V-shaped groove in said stimulated region is aligned on a same line as the corresponding edge of said portion of said V-shaped groove in each of said pair of window regions.

4,686,680

GAS LASER HAVING IMPROVED CROSSFLOW BLOWER ARRANGEMENT

Ethan Hoag, East Boston, and Glenn Zeiders, Marblehead, both of Mass., assignors to Laser Corporation of America, Lowell, Mass.

Filed Jun. 25, 1985, Ser. No. 748,505

Int. Cl.[4] H01S *3/22*

U.S. Cl. 372—58 **3 Claims**

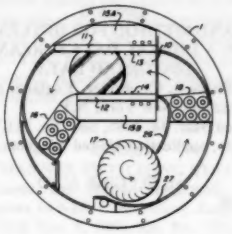
1. In a flowing gas laser of the type having a gas tight enclosure in which are situated

(a) means forming an electric discharge region in which lasing of the gas occurs,

(b) downstream heat exchanger means for cooling the gas after it has passed through the discharge region,

(c) a crossflow blower having an impeller that is substantially coextensive with the longitudinal extent of the discharge region, the crossflow blower propelling the gas around a closed loop within the enclosure, and

(d) cooling means for removing heat from the gas added by the work of the crossflow blower,



the improvement wherein

the cooling means for removing heat from the gas added by the work of the crossflow blower comprises cooling means disposed outside the blower's impeller in the path of at least one of the vortices generated by the blower whereby at least some of the added heat is removed outside of the main gas flow to the discharge region from gas flowing in a vortex.

4,686,681

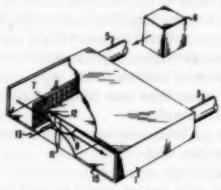
CONTINUOUS WAVE-MID-INFRARED GAS LASER UTILIZING RF EXCITATION

Joseph N. Paranto, Albuquerque, N. Mex.; John H. S. Wang, and Larry Williams, both of Rancho Palos Verdes, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 1, 1985, Ser. No. 761,274

Int. Cl.[4] H01S *3/097, 3/223*

U.S. Cl. 372—82 **8 Claims**



1. A laser system having a mid-infrared radio frequency transverse gas flow discharge waveguide, comprising:

(a) a pair of electrode means that face one another for defining a discharge region therebetween;

(b) laser gas means selected from the group of mixtures of hydrogen-fluoride and deuterium-fluoride, said laser gas means being at least partially confined in the laser discharge region between said electrode means for operation as the lasing medium;

(c) means for coupling continuous wave radio frequency energy to said electrode means in order to effect an electrical discharge in said laser gas means in the discharge region;

(d) pair of optical means that face one another and confining therebetween said electrode means for defining therebetween a longitudinal direction through the discharge region; and

(e) means for flowing said laser gas means in a direction transverse to said longitudinal direction through the discharge region of said electrode means so as to replenish said laser gas means in the discharge region.

4,686,682

DISCHARGE EXCITATION TYPE SHORT PULSE LASER DEVICE

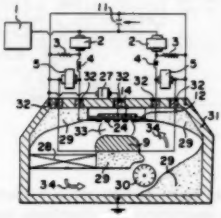
Kenyu Haruta, Mino; Hitoshi Wakata, Itami; Yukio Sato, Amagasaki; Haruhiko Nagai; Hajime Nakatani, both of Hyogo, and Hideki Kita, Toyonaka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 782,568

Claims priority, application Japan, Oct. 9, 1984, 59-212843; Oct. 11, 1984, 59-213633; Oct. 11, 1984, 59-213629; Nov. 12, 1984, 59-240181; Nov. 13, 1984, 59-239268; Feb. 18, 1985, 60-29791; Feb. 18, 1985, 60-29793; Feb. 18, 1985, 60-29794; Mar. 28, 1985, 60-67516

Int. Cl.[4] H01S *3/097*

U.S. Cl. 372—87 **22 Claims**



1. A discharge excitation type short pulse laser device comprising first and second main electrodes disposed in mutual confrontation, with the direction of the laser beam axis as their longitudinal direction; an auxiliary electrode provided on the rear surface part of said second main electrode and opposed to said second main electrode through a dielectric member; a pulse circuit for applying a pulse voltage across said first and second main electrodes; and a circuit for applying a voltage across said auxiliary electrode and said second main electrode, characterized in that said second main electrode is made of an electrically conductive material having a plurality of apertures therein, that said second main electrode and said dielectric member are disposed in tight adhesion to each other, and that said second main electrode is thinly formed to enable creeping discharge to be produced on the surface of said dielectric member, thereby distributing electrons to be the seed for the main discharge to be generated across said main electrode.

4,686,683

LASER ANGULAR RATE SENSOR WITH DITHERED MIRRORS

Graham J. Martin, Canoga Park, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Continuation-in-part of Ser. No. 569,079, Jan. 9, 1984, abandoned. This application Oct. 21, 1985, Ser. No. 789,480

Int. Cl.[4] H01S *3/083;* **G01B** *9/02*

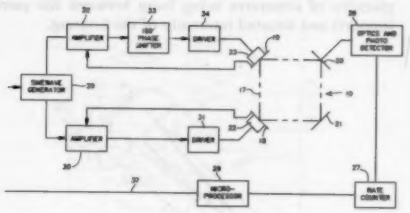
U.S. Cl. 372—94 **21 Claims**

1. In a ring laser angular rate sensor having a substantially square ring laser beam path about a sensing axis, including four corner mirrors, wherein first and second laser beams counterpropagate about said path, having means for extracting said counterpropagating beams and means for beating said extracted beams against each other, and further comprising processor means for converting the beat frequency so-obtained into a measure of angular velocity about said sensing axis, the improvement comprising:

first and second vibrating means, attached to said mirrors, for substantially sinusoidally dithering first and second consecutive ones of said mirrors along their optical axes, to distort said ring laser beam path while holding constant the length of said path;

drive circuit means, connected to drive said two vibrating means, for substantially sinusoidally energizing said first and second vibrating means, at the same mechanical frequency, in a 180 degree phase relationship, and to the same predetermined amplitude; and

means for controlling said amplitude to minimize the lock-in effects of mirror backscatter upon the operation of said sensor.



4,686,684

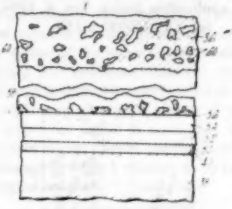
BURIED LASER MIRROR WITH A MULTICOMPONENT REFLECTIVE INTERLAYER

Donald A. Dalton, Albuquerque, N. Mex.; James R. Strife, South Windsor, and James L. Swindal, East Hampton, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Aug. 9, 1985, Ser. No. 764,149

Int. Cl.[4] H01S *3/08*

U.S. Cl. 372—99 **9 Claims**



1. A multicomponent reflective interlayer which provides an interior reflective surface in a buried mirror having a faceplate bonded to a substrate, comprising:

metal reflective means deposited on a faceplate surface abutting the substrate;

silicon nitride diffusion barrier means deposited on said reflective metal means for providing a limit to the diffusion of a bonding means therein; and

silicon dioxide surface wetting means deposited on said diffusion barrier means for providing a reduction in surface tension for said bonding means applied thereto.

4,686,685

GAS LASER HAVING THERMALLY STABLE OPTICAL MOUNT

Ethan D. Hoag, East Boston, Mass., assignor to Laser Corporation of America, Lowell, Mass.

Filed Jun. 6, 1985, Ser. No. 741,756

Int. Cl.[4] H01S *3/08*

U.S. Cl. 372—107 **4 Claims**

1. A flowing gas laser comprising

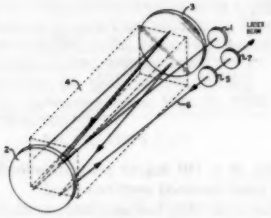
(a) an optical resonator having a plurality of mirrors,

(b) a hollow cylindrical housing,

(c) means for maintaining the housing at a substantially constant temperature by the circulation of a cooling fluid,

(d) a pair of supports, one of the supports being affixed to the housing and the other support fitting within the hollow of the cylindrical housing and being movable therein,

(e) a plurality of structures for causing lasing of the flowing gas and circulation of the gas within the housing, the plurality of structures being hung between the pairs of supports and situated internally of the housing,



(f) a first mount attached to one end of the housing, the first mount supporting one mirror of the laser's optical resonator, and

(g) a second mount attached to the housing and supporting another mirror of the laser's optical resonator, the two mirrors being positioned at opposite ends of the laser's optical resonator.

4,686,686

LINE EQUALIZER OPERABLE IN RESPONSE TO AN INPUT SIGNAL OF A VARIABLE DATA RATE

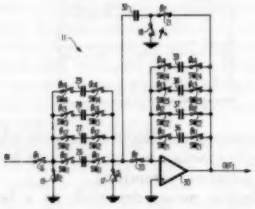
Kenji Nakayama, and Yayoi Takeuchi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Sep. 4, 1985, Ser. No. 772,538

Claims priority, application Japan, Sep. 4, 1984, 59-184815

Int. Cl.[4] H03K *5/159*

U.S. Cl. 375—11 **3 Claims**



1. A line equalizer operable in response to an input signal of a variable data rate to produce an equalizer output signal, said line equalizer comprising:

control means responsive to said input signal for producing clock signals having a frequency variable in accordance with said variable data rate;

a first switched capacitor circuit receiving said input signal and coupled to said control means, for producing a circuit output signal, said first switched capacitor circuit comprising a first capacitor array of a first set of capacitors and sampling means responsive to said clock signals for sampling said input signal at a sampling rate determined in relation to said variable data rate, said first switched capacitor circuit having a plurality of first frequency-gain characteristics which are classified into a plurality of steps for equalization of said input signal and which are determined by controlling said first capacitor array;

a second switched capacitor circuit receiving said circuit output signal and coupled to said control means, for producing said equalizer output signal, said second switched capacitor circuit having a plurality of second frequency-gain characteristics which are classified into a plurality of additional steps for compensation of said circuit output signal;

first signal generating means responsive to said input signal and said equalizer output signal for delivering a first selection signal to said first capacitor array to select said first frequency gain characteristics in accordance with both said variable data rate and an output level of the equalizer output signal and to shift the selected one of the first frequency-gain characteristics with reference to the variation of said variable data rate of the input signal; and

second signal generating means responsive to said input signal and said equalizer output signal for delivering a second selection signal to said second switched capacitor circuit to control said second frequency-gain characteristics with reference to the output level of said equalizer output signal and said variable data rate.

4,686,687

ANODE SYSTEM FOR PLASMA HEATING USABLE IN A TUNDISH

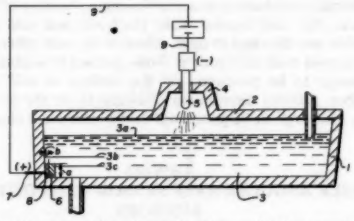
Hiroshi Mure; Ryohei Mizoguchi; Shinichi Yokoi; Shigeru Fujihara, and Kaoru Ichikawa, all of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Mar. 7, 1986, Ser. No. 837,375

Claims priority, application Japan, Mar. 4, 1986, 61-30996[U]

Int. Cl.[4] H05H *1/00;* **H05B** *7/00*

U.S. Cl. 373—22 **7 Claims**



1. An anode system for plasma heating usable in a tundish of a continuous casting apparatus, comprisng:

a dam member provided on the bottom of the tundish near a side wall member of the tundish to form a space therebetween; and

an electrical conductive member with its end portion exposed to the space and the other end being electrically connected to an electric power source for plasma;

said dam member having a height higher than a level of molten metal remaining after pouring out of the molten metal from the tundish, but lower than a minimum level of molten metal normally contained in the tundish, said electrical conductive member being inserted into the tundish from above and running on the inside wall of the tundish to the space, and the portion of the electrical conductive member exposed to the molten metal in the tundish except for the end portion being covered with a refractory cover.

4,686,688

ARRANGEMENT FOR GENERATING AN ANGLE-MODULATED CARRIER SIGNAL OF A CONSTANT AMPLITUDE IN RESPONSE TO DATA SIGNALS

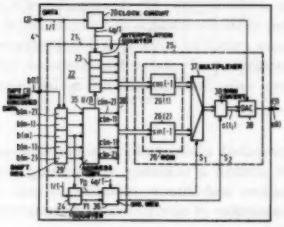
Kah-Seng Chung, Eindhoven, and Hendrikus L. Verstappen, Hilversum, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 16, 1985, Ser. No. 755,637

Claims priority, application Netherlands, Jul. 23, 1984, 8402318

Int. Cl.[4] H04L *27/12*; H03K *7/06*

U.S. Cl. 375—47 **7 Claims**



1. An apparatus for generating an angle modulated carrier having a constant amplitude and continuous phase $\phi(t)$ with data signals of a given symbol frequency 1/T comprising:

(a) a clock circuit synchronized with the symbol frequency which produces a clock signal having a frequency 4q/T, where q is an integer greater than 1;

(b) a control circuit comprising:

(i) an addressing circuit controlled by said clock signal, said addressing circuit comprising:

(A) an interpolation counter responsive to a given number of consecutive data symbols producing addresses at a frequency of 4q/T;

(B) a counter controlled by a signal having the symbol frequency, responsive to the data symbols for producing phase state numbers representing the phase $\phi(t)$ in modulo 2π values at the boundaries of the symbol intervals of length T; and

(C) and address converter circuit responsive to said given number of consecutive data symbols for producing addresses and for producing a conversion indication signal for said interpolation counter;

(ii) a selection signal generator controlled by the clock signal and responsive to the phase state numbers for producing first and second selection signals;

(c) a signal processor connected to the control circuit counters, said first selection signal enabling at each clock instant said signal processor to generate one of said two values representing the signals cos $\phi(t)$ and sin $\phi(t)$, said signal processor including a first read only memory addressable by addresses received from said address converter, said first read only memory being for storing only the values representing cos $\phi(t)$ and sin $\phi(t)$ for non-decreasing phases $\phi(t)$ associated with one predetermined number;

(d) a digital to analog converter connected to receive said first read only memory addressed contents, said digital to analog converter producing an inverted and non-inverted analog signal in response to said second selection signal, whereby said read only memory signals are converted into samples of a modulated carrier at a carrier frequency of q/T.

4,686,689

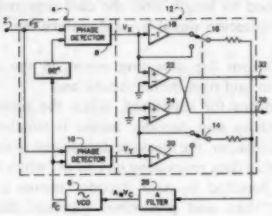
PHASE-LOCKED LOOP CIRCUIT

William L. Rorden, Grass Valley, Calif., assignor to Graham-Patten Systems, Inc., Grass Valley, Calif.

Filed Jul. 24, 1986, Ser. No. 890,426

Int. Cl.[4] H03D *3/18, 3/24*

U.S. Cl. 375—81 **13 Claims**



1. A phase-locked loop circuit for receiving an input signal that has a predetermined frequency during a succession of intervals and of which the phase during a given interval is related to the phase during a reference interval by the angle $2n\pi/N$, where N is a positive integer and n is an integer in the range from 0 to N−1, the circuit being operative to generate a reference signal of which the phase bears a desired relationship to the phase of the input signal during the reference interval and comprising a controllable oscillator that is responsive to a control signal to generate the reference signal, the frequency of the reference signal being a function of the value of the control signal and bearing a predetermined relationship to the predetermined frequency when the value of the control signal is substantially zero, and the circuit also comprising a demodulator for providing an output that unambiguously defines the phase of the input signal relative to the reference signal, and a function generator for receiving the output of the demodulator and generating the control signal such that when the phase of the input signal relative to the reference signal is equal to $2n\pi/N$ plus the phase of the input signal relative to the reference signal during the reference interval, the value of the control signal is zero and the first derivative of the value of the control signal with respect to the phase of the input signal relative to the reference signal is such that a change in the value of the control signal causes the frequency of the reference signal to change in such a manner as to restore the value of the control signal to zero.

4,686,690

SYNCHRONOUS DATA RECEIVER CIRCUIT

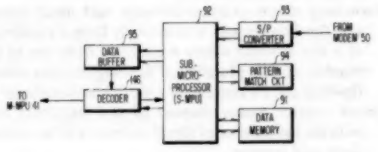
Osamu Sato, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 20, 1985, Ser. No. 746,700

Claims priority, application Japan, Jun. 22, 1984, 59-127313

Int. Cl.[4] H04L *7/08*

U.S. Cl. 375—114 **7 Claims**



1. A synchronous data receiver circuit comprising:

serial/parallel converter means for converting serial data, comprising at least frame synchronization data and message data, into parallel data;

data memory means for storing at least two frames of the parallel data supplied from said serial/parallel converter means;

pattern matching detector means for detecting in the patterns of the data stored in said data memory means a frame synchronization signal;

data buffer means for storing, as message data, data of a prescribed bit length after the data detected as the frame synchronization signal by said pattern matching detector means;

decoder means for detecting errors in the message data stored in said data buffer means; and

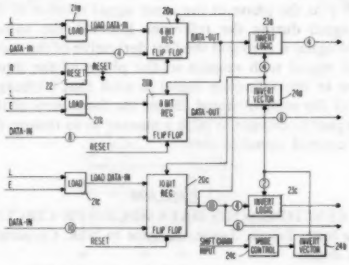
control means for supplying, when the number of errors detected by said decoder means is smaller than a prescribed number, the message data stored in said data buffer means to a data processing circuit or, when the number of errors detected by said decoder means is equal to or greater than said prescribed number, causing pattern matching to be performed again beginning with the data next to the frame synchronization signal earlier detected by said pattern matching detector means.

4,686,691

MULTI-PURPOSE REGISTER FOR DATA AND CONTROL PATHS HAVING DIFFERENT PATH WIDTHS

Gregory K. Deal, West Chester, Pa., and Richard J. Manco, Riverside, N.J., assignors to Burroughs Corporation, Detroit, Mich.

Filed Dec. 4, 1984, Ser. No. 678,027
Int. Cl.[4] G11C *19/00*
U.S. Cl. 377—54 **6 Claims**



1. A register circuit comprising:

a plurality of flip-flop circuits;

a plurality of output circuits, one for each flip-flop circuit;

a plurality of input circuits;

switching means coupled between said input circuits and said flip-flop circuits to selectively form a parallel register of n bits in width where n can vary from one to the total number of said plurality of flip-flop circuits where each flip-flop circuit represents a particular significant bit;

mode control means coupled to said switching means to indicate the number of flip-flop circuits to be connected to form said register;

said switching means being multiplexor circuits coupled to said respective flip-flop circuits and to said input circuits; and

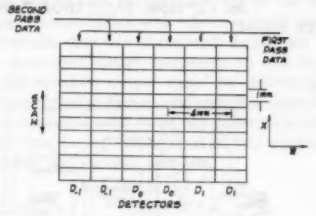
each multiplexor circuit being selectively coupled to the output circuit of the next lowest significant bit flip-flop circuit to form a shift register.

4,686,692

COMPUTED TOMOGRAPHY PATIENT LOCALIZATION SCANNING

Gordon D. DeMeester, Wickliffe, and Rodney A. Mattson, Mentor, both of Ohio, assignors to Picker International Inc., Highland Heights, Ohio

Filed Apr. 12, 1985, Ser. No. 722,672
Int. Cl.[4] G01N *23/04*
U.S. Cl. 378—4 **10 Claims**



2. In a computed tomography scanner wherein an x-ray source orbits around a scanning axis passing longitudinally through a patient and directs radiation to and through the patient from a number of directions to a detector array, apparatus comprising:

means for positioning said source at a first position relative to said patient;

means for relatively moving said source and detector array in unison longitudinally past a patient region of interest in a direction generally parallel to the scanning axis as the source irradiates said region;

means for converting intensity outputs from detectors in the array into a first shaowgraph data set;

means for orbiting said source to a second position and fixing said source relative to the patient prior to a reversal of relative longitudinal movement between the patient, the source and the array by said means for relatively moving while said means for converting produces a second shadowgraph data set; and

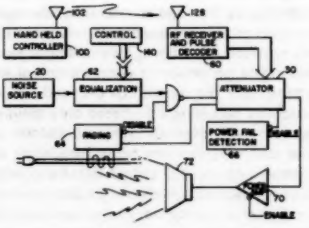
means for interleaving the data from the first and second data sets to provide a shadowgraph data set having greater resolution than either said first or second data set.

4,686,693

REMOTELY CONTROLLED SOUND MASK

David W. Ritter, Holmes, Pa., assignor to Sound Mist, Inc., Newtown Square, Pa.

Filed May 17, 1985, Ser. No. 735,570
Int. Cl.[4] H04R *3/00*
U.S. Cl. 381—73.1 **22 Claims**



1. A sound masking apparatus, comprising: one or more sound masking units, each unit including:

a signal source operable to supply an incoherent electrical signal over a range of audible frequency;

a power amplifier and audio transducer adapted to produce

an audible sound radiating into a free space defined by at least one of floors, walls and ceilings of a structure, the audible sound being produced in response to an electrical signal at an input to said power amplifier;

a programmable attenuator connected between the signal source and the power amplifier, the attenuator having means to adjust amplitude of the electrical signal at the input to the power amplifier, the one or more sound masking units being mountable in the structure and the audible sound radiating from the one or more sound masking units defining one or more masking zones; and,

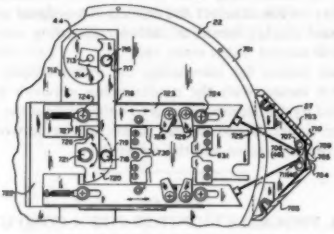
a remote controller operable to control operation of the attenuator of one said sound masking unit at a time from a distance, individually, the remote controller being mobile and including means to transmit a short-range radio signal across open air ways to the programmable attenuator, the radio signal adapted to indicate a desired power level and the programmable attenuator including means for receiving and decoding said signal, the programmable attenuator maintaining the desired level after cessation of the radio signal.

4,686,694

PROBE FOR AN APPARATUS FOR ANALYZING METALS BY X-RAY FLUORESCENCE

Peter F. Berry; Wendell D. Miller, and John L. Nethery, Jr., all of Austin, Tex., assignors to Ramsey Engineering Company, St. Paul, Minn.

Filed Dec. 15, 1980, Ser. No. 216,228
Int. Cl.[4] G21K *5/02;* G01N *23/223*
U.S. Cl. 378—120 **15 Claims**



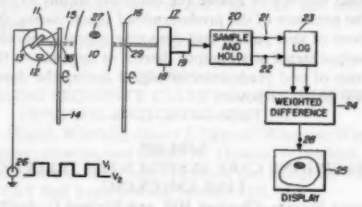
1. In an apparatus for analyzing a sample of material by the X-ray fluorescence method having a radiation source for radiating the sample, a radiation detector for receiving X-rays generated from the sample, and a detector housing for enclosing the radiation detector, the detector housing having an aperture formed in a side wall thereof, a source housing comprising: a source housing body formed as a hollow, generally right triangular prism tapering from an open base to a tip having an aperture formed therein; means for attaching said base of said source housing body to the detector housing over the aperture formed in the detector housing; and means for mounting the radiation source adjacent said aperture in said tip of said source housing body whereby, when said tip of said source housing body is positioned adjacent the material sample, radiation from the radiation source passes through said aperture in said tip to radiate the material sample and X-rays generated from the material sample pass through said aperture in said tip and said aperture in the detector housing to the radiation detector in said detector housing.

4,686,695

SCANNED X-RAY SELECTIVE IMAGING SYSTEM

Albert Macovski, Menlo Park, Calif., assignor to Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Continuation of Ser. No. 9,484, Feb. 5, 1979, abandoned. This application Nov. 17, 1980, Ser. No. 207,351
Int. Cl.[4] G03B *41/16*
U.S. Cl. 378—146 **41 Claims**



1. In a method for producing a low-scatter two-dimensional projection image of a specific material within a volume of the body the steps of:

forming an x-ray beam from the x-rays emitted from an x-ray source which irradiates a subsection of the volume and a corresponding subsection of the two-dimensional projection image;

collimating the x-ray beam emerging from the volume;

measuring the x-ray transmission through each subsection of the volume at two energy spectra using an integrating detector which receives transmitted x-rays substantially only from the extent of the collimated x-ray beam whereby most scattered radiation is eliminated;

synchronously scanning the x-ray beam and integrating detector with respect to the volume over the entire two-dimensional projection image;

processing the measurements at the two energy spectra to produce a processed two-dimensional projection signal representing the projected amount of the specific material in the volume; and

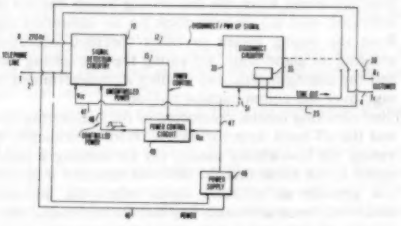
displaying the processed projection signal to provide a two-dimensional projection image of the specific material in the volume.

4,686,696

TRANSMISSION LINE SIGNAL SENSING CIRCUIT EMPLOYING MEANS FOR CONSERVING POWER, ESPECIALLY FOR USE WITH A TELEPHONE DISCONNECT CIRCUIT, AND ASSOCIATED METHOD

Daniel Lynch, Jackson, N.J., assignor to Keptel, Inc., Tinton Falls, N.J.

Filed Dec. 2, 1985, Ser. No. 803,801
Int. Cl.[4] H04M *3/26;* H04B *3/46*
U.S. Cl. 379—22 **34 Claims**



1. Apparatus for sensing a predetermined signal transmitted on a transmission line and for generating an output signal

indicating the presence of the predetermined signal comprising:

means for detecting the presence of the predetermined signal;

power supply means for generating power for said detecting means from a voltage present on said transmission line; and

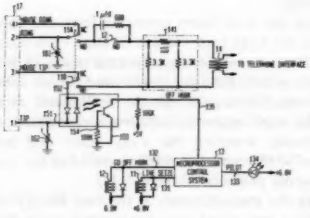
logic circuit means for gating pulses of power from said power supply means to said detecting means on a periodic basis thereby to enable the detecting means to check for the presence of the predetermined signal during the durations of said pulses, said detecting means generating said output signal at an output thereof in response to the presence of said predetermined signal during the duration of said pulses of power.

4,686,697

TELEPHONE CARE SYSTEM WITH TELEPHONE LINE-CHECKING

L. Dennis Shapiro, Chestnut Hill, and Richard G. Aseltine, Jr., Framingham, both of Mass., assignors to Lifeline Systems, Inc., Waltham, Mass.

Filed Nov. 21, 1983, Ser. No. 553,748
Int. Cl.[4] H04M *11/04*
U.S. Cl. 379—38 **4 Claims**



1. A system for communication by telephone wires of information concerning the circumstances of a subscriber, the system comprising:

(a) timing means for timing a predetermined interval of time from a beginning point established by a timer reset signal input and providing an expiration signal output upon the expiration of the predetermined interval of time;

(b) line-seizing means for connecting a communication output to the telephone wires;

(c) off-hook detector means connected to the telephone wires for sending an off-hook signal when a telephone circuit is in an off-hook condition;

(d) dialing means for dialing a telephone number over the communicator output;

(e) control means, connected to the timing means, line-seizing means, the off-hook detector means, and the dialing means, for (i) providing a timer reset signal to the timing means on receippt of an off-hook signal from the off-hook detector means when the line-seizing means has not been activated, and (ii) on activation by an expiration signal from the timing means or other specified occurrence, entering an alarm state, activating the line-seizing means and the dialing means, and sending a predetermined message over the communicator output;

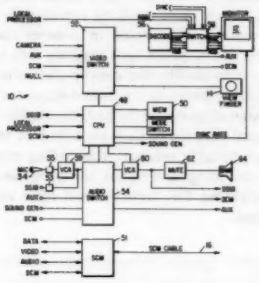
(f) line-checking means, connected to the line-seizing means and the off-hook detector means, (i) for periodically activating the line-seizing means, (ii) for sending a bad-line signal in the event that the off-hook detector means does not provide an off-hook signal when the line-seizing means has been activated, and (iii) for increasing the frequency of activation of the line-seizing means when the control means is not in an alarm state, in the event that an off-hook signal is not provided by the off-hook detector means on activation of the line-seizing means.

4,686,698

WORKSTATION FOR INTERFACING WITH A VIDEO CONFERENCING NETWORK

E. Neal Tompkins; Kim K. Riley; Jack N. Bartholmae, and Michael W. Barry, all of San Antonio, Tex., assignors to Datapoint Corporation, San Antonio, Tex.

Filed Apr. 8, 1985, Ser. No. 721,083
Int. Cl.[4] H04N *7/14*
U.S. Cl. 379—53 **32 Claims**



1. A workstation for interfacing with a video conferencing network, comprising:

camera means for receiving images and converting the received images to a first video signal at a first video rate;

auxiliary video means for generating a second video signal at a second video rate;

video switch means for receiving the first and second video signals and selectively outputting only one of the received video signals;

display means for receiving the output video signal from said switch means and displaying it for visual perception, said display means operable to operate either said first or second video rates;

means for controlling said video switch means and said display means to select the desired video signal and operate said display means at the corresponding one of said first or second video rates; and

interface means for interfacing the video output by said switch means with the conferencing network and controlled by said control means to either output the selected video signal to said display means or the network or to said display means and the network.

4,686,699

CALL PROGRESS MONITOR FOR A COMPUTER TELEPHONE INTERFACE

Bruce J. Wilkie, Ijamsville, Md., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 21, 1984, Ser. No. 684,826
Int. Cl.[4] H04M *11/06*
U.S. Cl. 379—93 **13 Claims**

1. In a computer telephone interface system, a call progress monitor comprising:

an energy detector connected to a telephone line to receive signals from said telephone line;

a bandpass filter connected to said telephone line, having a selectable center frequency, said bandpass filter having a control input for selecting one of a plurality of bandpass center frequencies;

a counter-timer connected to a clock pulse source to count clock pulses, said counter-timer having a reset input connected to said energy detector whereby timing counting commences in response to the presence of a signal on said telephone line as detected by said energy detector;

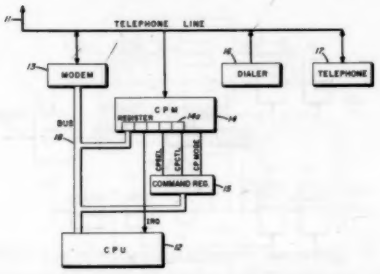
center frequency control means connected between said counter-timer and the control input of said bandpass filter,

said control means changing the frequency passed by said bandpass filter in synchronism with the counting of said counter-timer during a first frequency measuring portion of the period counted by said counter-timer;

a signal detector connected to said filter for indicating the presence of a signal passing through said filter;

a data register; and,

decoding means connected to said counter-timer and said signal detector for generating during said first portion of the period counted by said counter, a binary signal indicating the frequency at which said bandpass filter passes a signal, and for generating during a second cadence measuring portion of said period following said first portion thereof, a binary signal indicating the duration of a cadence interval of signal energy detected by said energy detector, said decoding means sequentially writing said frequency indicating and cadence indicating binary signals into said register.



4,686,700

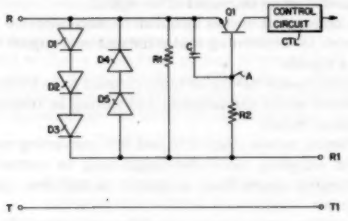
TELEPHONE OFF-HOOK DETECTOR CIRCUIT

Steven B. Perry, Highlands, N.J., assignor to Keptel, Inc., Ocean, N.J.

Filed Oct. 24, 1986, Ser. No. 922,685

Int. Cl.[4] H04M *13/00, 3/22*

U.S. Cl. 379—183 **6 Claims**



1. A circuit for connection into a telephone line for detecting when a telephone instrument has gone off-hook and which is unaffected by the presence of a ringing signal on the telephone line comprising:

switching means connected to the telephone line having a control input;

first means coupled to the telephone line and the switching means for developing a first voltage thereacross when the telephone instrument has gone off-hook;

means coupled to the first means for charging to the first voltage when the telephone instrument has gone off-hook after a time delay and for activating said switching means;

second means coupled to the telephone line, the switching means and the first means for developing a second voltage thereacross during one half cycle of a ringing signal on the telephone line, said first means developing said first voltage during a second half cycle of the ringing signal, said first and second voltages being of opposite polarity, whereby said charging means alternately charges toward said first and second voltages during the ringing signal, said charging means having a time constant such that said charging means never charges to a voltage during a half cycle of said ringing signal sufficient to activate said switching means and on the average, said charging means maintains the control input of said switching means at a potential substantially intermediate said first and second voltages.

4,686,701

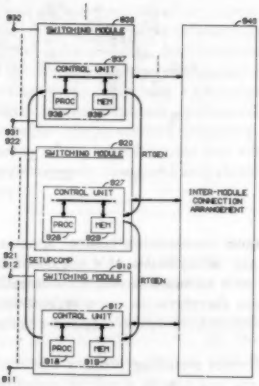
PROCESSING SEQUENCE CALLS IN A DISTRIBUTED CONTROL SWITCHING SYSTEM

Mahmood Ahmad, Winfield; Albert J. Sawyer, Wheaton; Wayne L. Schreiner, Oswego, and Gerald H. Thomas, Woodridge, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 7, 1985, Ser. No. 699,464

Int. Cl.[4] H04M *3/54;* **H04Q** *3/47*

U.S. Cl. 379—211 **25 Claims**



5. In a switching system having a plurality of ports, said switching system comprising a plurality of switching modules each associated with a corresponding subset of said ports,

each of said switching modules comprising means for determining based on directory numbers, terminating ones of said plurality of ports for calls, and means for storing sequence call data for each port of the associated subset of said ports,

a call processing method comprising

a first one of said switching modules determining, based on a directory number received for a given call from an originating port associated with said first switching module, a first terminating port associated with a second one of said switching modules,

said first switching module transmitting a first message to said second switching module defining said given call and said first terminating port,

said second switching module reading the sequence call data for said first terminating port,

said second switching module determining based on a second directory number, when said sequence call data for said first terminating port defines that calls are to be routed to said second directory number, a second terminating port associated with said first switching module,

said second switching module transmitting a second message to said first switching module defining said given call and said second terminating port,

said first switching module reading the sequence call data for said second terminating port and

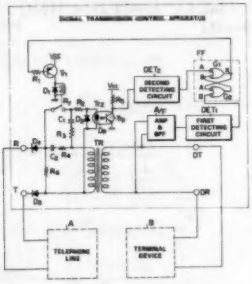
said first switching module connecting said originating port and said second terminating port, when said sequence call data for said second terminating port defines that calls are to be completed to said second directory number.

4,686,702

SIGNAL TRANSMISSION CONTROL APPARATUS

Yoshio Kizaki, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Aug. 29, 1985, Ser. No. 770,728
Claims priority, application Japan, Aug. 31, 1984, 59-182028
Int. Cl.[4] H04M *3/02*
U.S. Cl. 379—373 9 Claims



1. A signal transmission control apparatus connected between a pair of terminals of a telephone line and a pair of terminals of a terminal device for controlling mutual signal transmission therebetween upon receipt from said telephone line terminals of a control voltage and a calling signal, comprising:

a transformer including primary and secondary coils, said primary coil having a pair of terminals connected with said telephone line terminals and said secondary coil having a pair of terminals connected with the terminal device terminals;

a first signal detecting circuit means connected with the secondary coil terminals of said transformer for producing a detection signal in response to said calling signal from said telephone line;

first DC and AC circuits connected to the terminals of the telephone line and the primary coil that become conductive upon receipt of said control voltage from the telephone line for effecting conduction between the primary coil of said transformer and said telephone line;

second DC and AC circuits, that are connected to the primary coil of said transformer, said second DC and AC circuits being normally deactivated and being activated in response to said detection signal;

a relay for activating said second DC and AC circuits in response to said detection signal;

a switching circuit for activating said relay in response to said detection signal;

means responsive to said second DC circuit for producing an indicator signal that said second DC circuit is activated; and

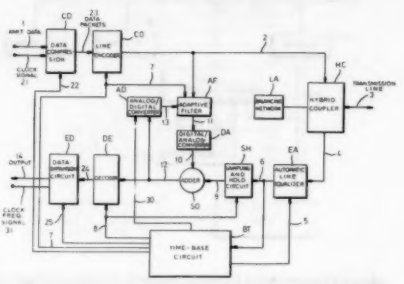
a control means that energizes said switching circuit in response to said detection signal from said first signal detecting circuit and that maintains said switching means energized in response to said indicator signal.

4,686,703

SYSTEM FOR BIDIRECTIONAL DIGITAL TRANSMISSION WITH ECHO CANCELLATION

Carlo M. Bruno; Gianfranco Panarotto, both of Turin, and Adler Tofanelli, Collegno, all of Italy, assignors to Cselt-Centro Stude e Laboratori Telecomunicazione S.p.A., Turin, Italy

Filed Mar. 21, 1985, Ser. No. 714,708
Claims priority, application Italy, Mar. 26, 1984, 67285 A/84
Int. Cl.[4] H04B *3/23*
U.S. Cl. 379—410 12 Claims



7. A digital bidirectional transmission system with echo cancellation for a transmission line, comprising:

compressing means for compressing data at an input of said compressing means into packets with a first duration, separated by silence intervals with a second duration;

encoding means coupled to said compressing means for encoding in line code data from an output of said compressing means;

hybrid means coupled to said encoding means and coupled to said transmission line for transferring said line code data to said transmission line and for transferring from said transmission line data received from said transmission line;

balancing means coupled to said hybrid means to compensate for reflections generated on said transmission line;

adaptive filtering means coupled to said encoding means for generating an estimated echo signal;

first converting means coupled to said adaptive filtering neans for converting said estimated echo signal into analog signals;

sampling means having an input coupled to an output of said hybrid means for sampling and storing an output of said hybrid means;

combining means coupled to said first converting means and said sampling means for subtracting an output of said sampling means from an output of said first converting means;

second converting means coupled to an output of said combining means and to said adaptive filtering means, for converting an output of said combining means into digital signals and inputting said digital signals to said adaptive filtering means;

decoding means coupled to said output of said combining means to generate signals arranged in packets;

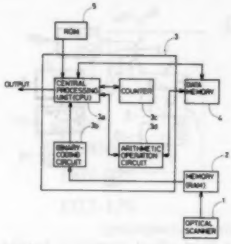
expanding means coupled to an output of said decoding means for expanding the packets of signals received therefrom; and

timing means coupled to said second converting means, compressing means, encoding means, decoding means, expanding means and sampling means for supplying respective enabling signals thereto, so that said sampling means is enabled by said timing means to sample said output of said hybrid means once per unit of time.

4,686,704
INFORMATION INPUT APPARATUS

Hiroshi Kamada, Yamatokoriyama, and Sumio Kita, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 3, 1984, Ser. No. 606,535
Claims priority, application Japan, May 9, 1983, 58-82286
Int. Cl.[4] G06K *9/20*
U.S. Cl. 382—61 **1 Claim**



1. Sheet type of recognition apparatus comprising:

optical scanner means for reading a sheet containing optical information and generating electrical information signals therefrom;

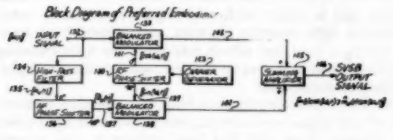
a memory for storing said information signals; and

a controller coupled to said memory and including a central processing unit, a binary coding circuit, a counter and an arithmetic operation circuit for automatically determining whether said information comprises an OMR code sheet, an OCR code sheet, a document sheet, or a mixture thereof, said controller determines sheet information sequentially in first and second orthogonal directions, said controller senses the occurence of an OMR or OCR code along said orthogonal direction and finding none determines that the sheet comprises a document sheet and in the event one of the said codes is found, causes information contained thereat to be read, said code comprises an OMR code and said controller operates to detect a timing mark on said sheet in X and Y directions by first sensing a dark timing mark in one of said directions, sensing a light portion of the sheet in the same direction, calculating the width dimension of the timing mark, determining whether the width dimension of the timing mark is located within a predetermined region of the sheet, repeating the process for another timing mark, and determining if there is a predetermined separation distance between the timing marks so that a predefined pattern is sensed from which the sheet is judged to be an OMR sheet, otherwise it constitutes a document sheet and then repeating the aforesaid operation for the other of said directions.

4,686,705
SPECIAL VESTIGIAL SIDEBAND SIGNAL FOR USE IN COMMUNICATION SYSTEMS

Stephen F. Smith, Knoxville, Tenn., assignor to Alpha-Omega Engineering, Inc., Knoxville, Tenn.

Continuation of Ser. No. 574,388, Jan. 27, 1984, Pat. No. 4,660,222. This application Nov. 17, 1986, Ser. No. 931,428
Int. Cl.[4] H03C *1/52;* **H04B** *1/68*
U.S. Cl. 455—109 **8 Claims**



1. A circuit for generating a vestigial-sideband waveform having enhanced bandwidth and amplitude characteristics and comprising:

(a) a first signal source for generating a baseband signal which may include a d.c. component;

(b) a second signal source for generating a carrier signal;

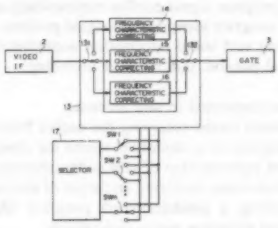
(c) a signal modulating or multiplying device for receiving the baseband signal from the first source and the carrier signal from the second source and electronically multiplying the carrier signal by the baseband signal to produce a double-sideband AM signal with an appropriate carrier component or suppressed carrier, depending on the presence of a d.c. component in the baseband signal;

(d) signal converting means for accepting the double-sideband AM signal, with or without a carrier component, and processing it to produce a vestigial-sideband output signal, having an instantaneous bandwidth intermediate to that of a corresponding double-sideband signal which would be produced by said baseband signal and that of a corresponding single-sideband signal which would be produced by said baseband signal, which vestigial-sideband output signal can be detected without distortion by conventional double-sideband receiving equipment employing synchronous or "product" detectors as if the vestigial-sideband signal were a conventional double-sideband signal with an appropriate carrier component, and which possesses no amplitude peaks substantially in excess of those of the corresponding double-sideband signal regardless of the original baseband modulating signal, said signal converting means comprising a specialized vestigial-sideband filter whose amplitude characteristic versus frequency possesses complementary symmetry about the carrier frequency of the second source and whose phase response is approximately linear and antisymmetric about that frequency.

4,686,706
DIGITAL SIGNAL RECEIVER

Mutsuo Sakai, Matsubara, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan

Continuation of Ser. No. 515,115, Jul. 19, 1983, abandoned. This application May 19, 1986, Ser. No. 865,954
Claims priority, application Japan, Jul. 19, 1982, 57-126461
Int. Cl.[4] H04B *11/16, 1/16*
U.S. Cl. 455—186 **3 Claims**



1. A digital signal receiver for receiving a digital signal included in a transmitted broadcasting signal, comprising:

channel selecting means for selecting transmitted broadcasting signal channels;

demodulating means for demodulating a broadcasting signal of a channel selected by said channel selecting means and outputting an output signal including a digital signal;

digital signal reproducing means for slicing and samping said output signal from said demodulating means and reproducing the digital signal;

a plurality of frequency characteristics correcting means having different frequency characteristics for correcting the frequency characteristic of the total signal transmis-

sion path from a broadcasting transmitter to an output point of said demodulating means;

selecting means operatively connected to said plurality of frequency characteristics correcting means for selectively switching one of said frequency characteristics correcting means into the signal path after said demodulating means; and

preset means operatively connecting said selecting means to said channel selecting means so that one of said frequency characteristics correcting means corresponding to the channel selected by said channel selecting means is selected and connected into said signal path by said selecting means.

4,686,707

PROGRAM IDENTIFIER SIGNAL RECEIVER

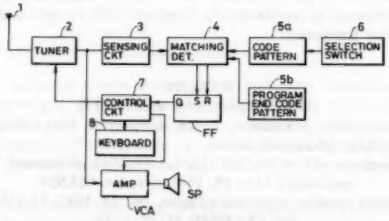
Hideki Iwasaki; Tomohisa Yokokawa, and Masanori Kurosaki, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 29, 1985, Ser. No. 738,719

Claims priority, application Japan, May 29, 1984, 59-107595

Int. Cl.[4] H04B *1/16*

U.S. Cl. 455—200 **6 Claims**



1. A broadcast wave receiver for receiving a program signal, said receiver having means for receiving a broadcast signal containing a program signal portion representing audio information and a program identification signal portion, and means for reproducing said audio information accordance with said program signal portion, said receiver including:

an antenna;

tuner means connected to said antenna;

volume control means receiving the output from said tuner and responsive to a detection means for controlling the volume of reproduction of said audio information;

said detection means receiving an output of said tuner means for detecting a predetermined program identification signal, said detection means comprising:

means for detecting a selected one of a plurality of program identification signals, comprising:

manually operated selection means for selecting that one of said program identification signals to be detected;

sensing means for sensing said program identification signal portion;

start code pattern generation means for selectively generating one of a plurality of different start code patterns; and

comparison means for comparing said sensed program identification signal to the generated start code pattern and for providing an output signal to said volume control means when said compared patterns match.

4,686,708

ANTENNA CIRCUIT

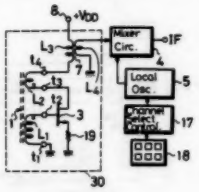
Ryuji Oki, Tokyo, and Tadashi Sakai, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 27, 1985, Ser. No. 813,836

Claims priority, application Japan, Jan. 8, 1985, 60-1347

Int. Cl.[4] H04B *1/18*

U.S. Cl. 455—280 **6 Claims**



1. An antenna circuit comprising:

a ferrite core, a field effect transistor having a grounded source, a gate and a drain, a main coil and a negative feedback coil wound around said core, and a load; and in which said main coil has a substantially greater number of turns than said negative feedback coil and is connected to said field effect transistor so that a voltage induced in said main coil is applied across said gate and source to thereby form an aperiodic circuit by which said voltage is amplified by said field effect transistor and converted to a drain current of the latter which flows in said negative feedback coil having its opposite ends connected to said drain and said load, respectively.

4,686,709

OPTICAL TRANSMISSION CIRCUIT

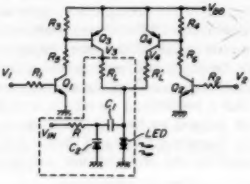
Masaru Nawaki, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 2, 1985, Ser. No. 751,621

Claims priority, application Japan, Jul. 18, 1984, 59-150943

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—613 **8 Claims**



1. An optical transmission circuit comprising

a self-excited oscillator means including a negative-resistance semiconductor light-emitting element and a first load resister which are connected in series,

a modulator means connected to a point between said negative-resistance semiconductor light-emitting element and said first load resister for modulating the frequency of said self-excited oscillator means by an analog input to said modulator means,

a second load resistor connected in parallel to said first load resistor and in series with said negative-resistance semiconductor light-emitting element, said second load resistor having a load line which intersects the light-emitting region of said negative-resistance semiconductor light-emitting element, and

a means for intermittently switching the effective connection of said negative-resistance semiconductor light-emitting element from said first load resistor to said second load resistor by a digital input to said intermittently switching means.

DESIGN PATENTS

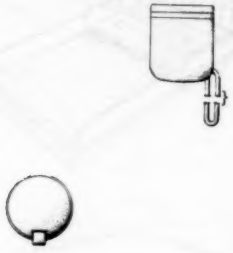
GRANTED AUG. 11, 1987

ERRATA

For CLASS	See PATENT NO.
D03-035	291,327
D22-129	291,335

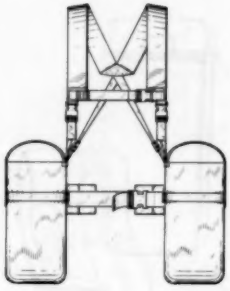
DESIGN PATENTS

291,260
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Dec. 23, 1986, Ser. No. 946,287
Term of patent 14 years
U.S. Cl. D3—12



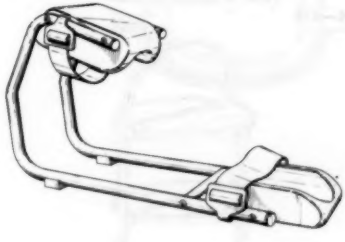
291,261
UMBRELLA HANDLE
Ann S. Cain, Cincinnati, Ohio, assignor to 'totes', incorporated, Loveland, Ohio
Filed Dec. 23, 1986, Ser. No. 946,288
Term of patent 14 years
U.S. Cl. D3—12

291,262
MAIL POUCH
Jeffrey S. Colby, 5985 Glencoe Rd., Excelsior, Minn. 55331
Filed Nov. 15, 1984, Ser. No. 671,855
Term of patent 14 years
U.S. Cl. D3—32



291,263
FIREMAN'S PICTURE FRAME
Charles H. Furey, 633 Wyoming Dr., Toms River, N.J. 08753
Filed Nov. 30, 1984, Ser. No. 676,874
Term of patent 14 years
U.S. Cl. D6—303

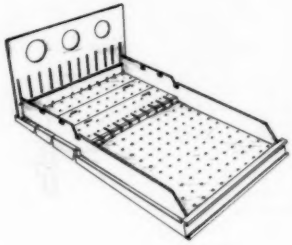
291,264
COMBINED KNEELER AND SEAT UNIT
Hans C. Mengshoel, Bygdoy Allé 12, 0262 Oslo 2, and Peter Opsvik, Högtunveien 12, 1370 Asker, both of Norway
Filed Mar. 22, 1985, Ser. No. 715,084
Claims priority, application Norway, Dec. 19, 1984, 65847
Term of patent 14 years
U.S. Cl. D6—335

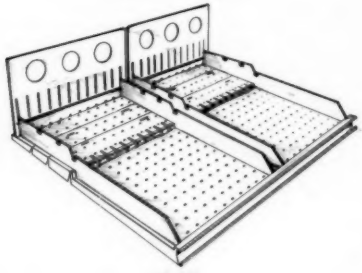


291,265
ADJUSTABLE CHAIR
Kjell A. Heggdal, Ikornnes; Ola Haukvik, Sykkylven; Harald Relling, Langevåg; Martin Lunde, Stranda, and Harry Mork, Hundeidvik, all of Norway, assignors to J. E. Ekornes A/S, Ikornnes, Norway
Filed Apr. 18, 1984, Ser. No. 601,540
Claims priority, application Norway, Oct. 26, 1983, 64537
Term of patent 14 years
U.S. Cl. D6—367

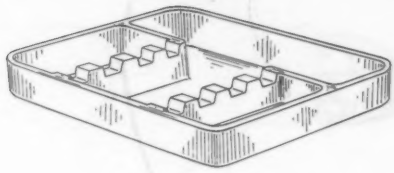
291,266
PORTABLE TABLE
Charlie Lin, 4772 Lincoln Ave., Cypress, Calif. 90630, and Geoffrey Wu, Taipei, Taiwan, assignors to Charlie Lin, Cypress, Calif.
Filed Feb. 19, 1985, Ser. No. 702,591
Term of patent 14 years
U.S. Cl. D6—479

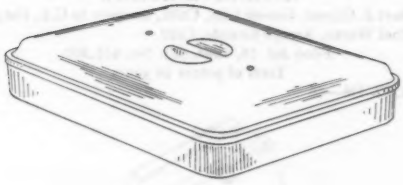
291,267
DISPLAY SHELF
Stanton J. Canter, Carversville, Pa., assignor to Diversified Group, Inc., Teleford, Pa.
Filed Jul. 23, 1984, Ser. No. 633,245
Term of patent 14 years
U.S. Cl. D6—511



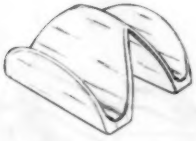


291,268
TOOTHBRUSH CONTAINER
Eric A. Stephenson, 20 Highcroft Court, Kitchener, Ontario, Canada N2E 2N9
Filed Nov. 26, 1984, Ser. No. 674,859
Term of patent 14 years
U.S. Cl. D6—534



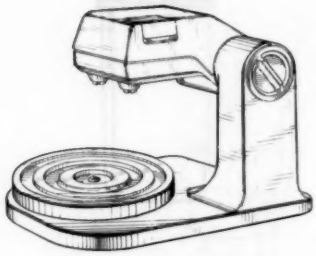


291,269
DUAL TACO SERVER
Norman L. Richards, 219 Barcelona, San Clemente, Calif. 92672
Filed May 20, 1985, Ser. No. 736,055
Term of patent 14 years
U.S. Cl. D7—76

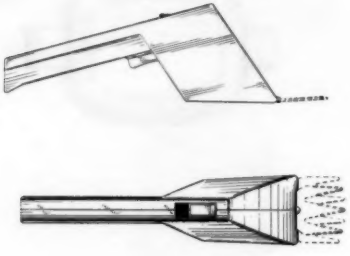


291,270
PITCHER
Pierre Tardif, Vieux Montreal, Canada, assignor to Genin-Trudeau & Cie Limited, Boucherville, Canada
Filed Apr. 12, 1985, Ser. No. 722,410
Claims priority, application Canada, Oct. 31, 1984, 31-10-84-6
Term of patent 14 years
U.S. Cl. D7—317

291,271
FOOD MIXER
Ian G. Wilson, New South Wales, Australia, assignor to Sunbeam Corporation, Downers Grove, Ill.
Filed Sep. 21, 1984, Ser. No. 653,378
Term of patent 14 years
U.S. Cl. D7—379

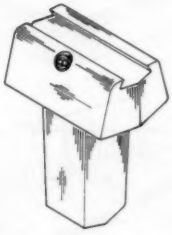


291,272
HOUSING FOR A RECHARGEABLE GARDEN TOOL
Charles R. Lewis, Jr., Newtown, Pa., and Donald R. McCloskey, Trappe, Md., assignors to Black & Decker, Inc., Newark, Del.
Continuation of Ser. No. 528,631, Sep. 1, 1983, abandoned. This application Jan. 22, 1986, Ser. No. 821,227
Term of patent 14 years
U.S. Cl. D8—8

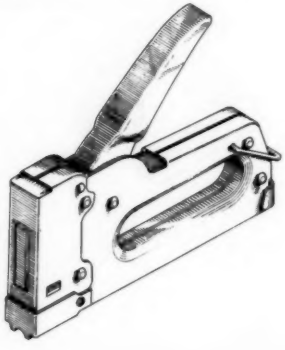


291,273
COMBINED SNOW SHOVEL AND PUSHER
Mike Vosbikian, Medford, N.J., assignor to Hardware & Industrial Tool Co., Inc., Cinnaminson, N.J.
Filed Jan. 4, 1985, Ser. No. 688,732
Term of patent 14 years
U.S. Cl. D8—10

291,274
ANVIL DEVIL HOLDER
Robert J. Garner, Grover City, Calif., assignor to G.E. Forge & Tool Works, Arroyo Grande, Calif.
Filed Jul. 16, 1984, Ser. No. 631,300
Term of patent 14 years
U.S. Cl. D8—46

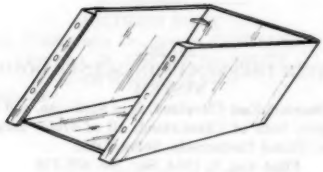


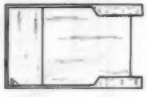
291,275
STAPLING GUN
Ted S. Chang, No. 27, Lane 333, Road Shin Shuh, Shin Chuang City, Tapei, Taiwan
Filed Nov. 9, 1984, Ser. No. 669,751
Term of patent 14 years
U.S. Cl. D8—49



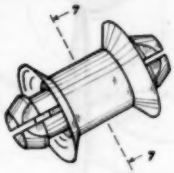
291,276
POWER SAW HANDLE
Ralph Karubian, 7100 S. Avalon Blvd., Los Angeles, Calif. 90003
Filed Oct. 12, 1982, Ser. No. 433,649
Term of patent 14 years
U.S. Cl. D8—107

291,277
REMOTE TRANSOM BRACKET FOR BOAT MOTOR
Francis M. Hawkins, 112 Elwood Dr., Jacksonville, Ark. 72076, and Neil E. Baker, 3420 McCord, North Little Rock, Ark. 72116
Filed Dec. 13, 1984, Ser. No. 681,266
Term of patent 14 years
U.S. Cl. D8—349

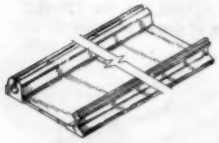


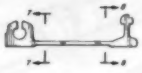


291,278
PRINTED CIRCUIT BOARD STAND-OFF
Royce W. Hill, Flippin, Ark., assignor to Micro Plastics, Inc., Flippin, Ark.
Filed Feb. 22, 1985, Ser. No. 704,519
Term of patent 14 years
U.S. Cl. D8—354

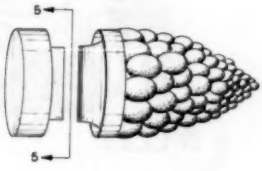


291,279
SLIDE BRACKET
Robert M. Bergeron, 27 Ball Ave., North Salem, N.H. 03073
Filed Feb. 14, 1985, Ser. No. 701,554
Term of patent 14 years
U.S. Cl. D8—373



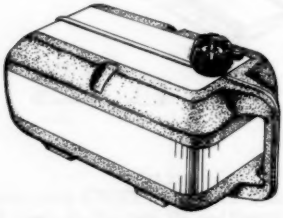


291,280
DISPENSING CONTAINER
Lawrence S. Albright, Plant City, Fla., assignor to Jerry Burnett Jones and Virginia Leda Jones, both of Lakeland, Fla.
Filed Aug. 20, 1984, Ser. No. 642,549
Term of patent 14 years
U.S. Cl. D9—302



291,281
COMBINED BOTTLE AND ROPE
William E. Danner, Don Mills, Canada, assignor to The Bronztan Corporation, Naples, Fla.
Filed Feb. 7, 1985, Ser. No. 699,166
Term of patent 14 years
U.S. Cl. D9—337

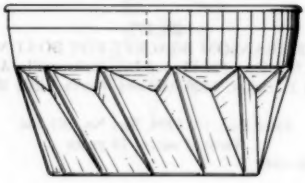
291,282
FUEL CONTAINER OR THE LIKE
Steven P. Belletire, Oak Park, Ill., assignor to Attwood Corporation, Lowell, Mich.
Filed May 1, 1985, Ser. No. 729,407
Term of patent 14 years
U.S. Cl. D9—376



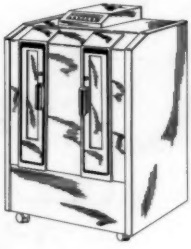
291,283
BOTTLE
Larry M. Taylor, Stonington, Conn., assignor to Monsanto Company, St. Louis, Mo.
Filed Jan. 18, 1985, Ser. No. 692,466
Term of patent 14 years
U.S. Cl. D9—398

291,284
BOTTLE
Larry M. Taylor, Stonington, Conn., assignor to Monsanto Company, St. Louis, Mo.
Filed Jan. 18, 1985, Ser. No. 692,467
Term of patent 14 years
U.S. Cl. D9—412

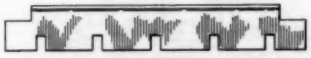
291,285
PACKAGING CONTAINER FOR FOOD OR THE LIKE
Bud Jarrin, and Jo-Anne Jarrin, both of New York, N.Y., assignors to Lever Brothers Company, New York, N.Y.
Continuation of Ser. No. 729,896, May 2, 1985, abandoned, which is a continuation of Ser. No. 341,968, Sep. 22, 1982, abandoned. This application Mar. 12, 1986, Ser. No. 839,464
Term of patent 14 years
U.S. Cl. D9—429



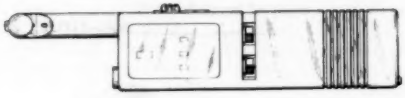
291,286
AUTOMATED THERMOLUMINESCENCE DOSIMETRY SYSTEM
Erwin F. Shrader, East Cleveland; Sam Sarkisian, and Kenneth E. Wagner, both of Chesterland, all of Ohio, assignors to Harshaw/Filtrol Partnership, Solon, Ohio
Filed Aug. 9, 1984, Ser. No. 639,226
Term of patent 14 years
U.S. Cl. D10—47



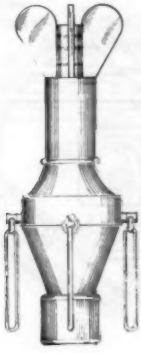
291,287
ALIGNMENT TEMPLATE OR SIMILAR ARTICLE
David P. Eisenhauer, Greer, S.C., assignor to NCR Corporation, Dayton, Ohio
Filed Sep. 19, 1984, Ser. No. 652,361
Term of patent 14 years
U.S. Cl. D10—64



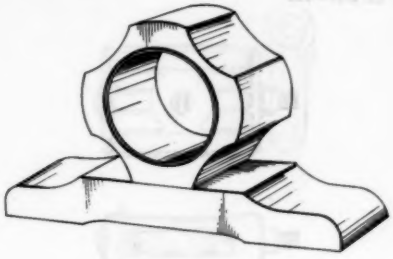
291,288
WIRE TESTER WITH FLASHLIGHT
Atsuhiro Suzuki, Suginami, Japan, assignor to Car Mate Mfg. Co. Ltd., Tokyo, Japan
Filed Jan. 31, 1985, Ser. No. 696,762
Claims priority, application Japan, Aug. 8, 1984, 59-33605
Term of patent 14 years
U.S. Cl. D10—78



291,289
DISTRESS BOUY
Nick F. Leo, 27400 Garza Dr., Saugus, Calif. 91350
Filed Oct. 24, 1984, Ser. No. 664,075
Term of patent 14 years
U.S. Cl. D10—107



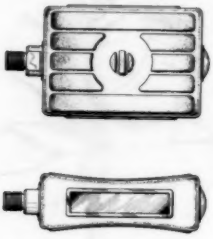
291,290
COMBINED CLOCK AND STAND
Roy R. Cunningham, 20349 NE. Sandy Blvd., Troutdale, Oreg. 97060
Filed Feb. 13, 1985, Ser. No. 701,317
Term of patent 14 years
U.S. Cl. D10—128



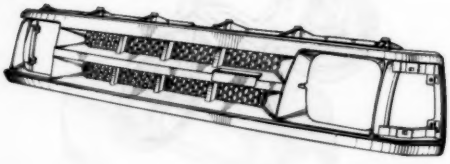
291,291
CHILD'S BICYCLE
C. L. Voytko, Johnstown, and Joel C. Cunard, Bedford, both of Pa., assignors to Hedstrom Corporation, Bedford, Pa.
Filed Sep. 20, 1985, Ser. No. 778,417
Term of patent 14 years
U.S. Cl. D12—111

291,292
CHILD'S RACING BIKE
Stephen W. Smith, and Joel C. Cunard, both of Bedford, Pa., assignors to Hedstrom Corporation, Bedford, Pa.
Filed Sep. 20, 1985, Ser. No. 778,418
Term of patent 14 years
U.S. Cl. D12—111

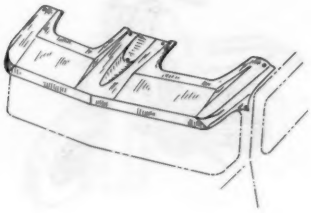
291,293
PEDAL FOR A BICYCLE
Verlon D. Downing, Centerville; Steven R. Pulskamp, New Bremen, and William H. Ropp, Centerville, all of Ohio, assignors to Huffy Corporation, Dayton, Ohio
Filed Apr. 5, 1985, Ser. No. 720,431
Term of patent 14 years
U.S. Cl. D12—125



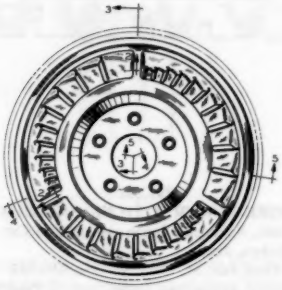
291,294
AUTOMOBILE RADIATOR GRILL
Ryoichi Soma, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan
Filed Dec. 23, 1985, Ser. No. 812,853
Term of patent 14 years
U.S. Cl. D12—163



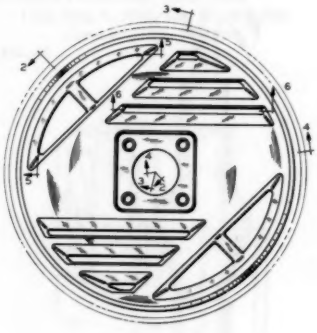
291,295
WINDSHIELD VISOR FOR TRUCKS
Allan W. Lund, 2641 - 118th Ave. NW., Minneapolis, Minn. 55433
Filed Sep. 2, 1983, Ser. No. 528,981
Term of patent 14 years
U.S. Cl. D12—191



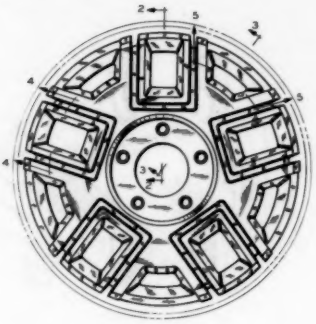
291,296
VEHICLE WHEEL CENTER
Donald J. Reid, Plymouth, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.
Filed Aug. 12, 1985, Ser. No. 764,822
Term of patent 14 years
U.S. Cl. D12—206



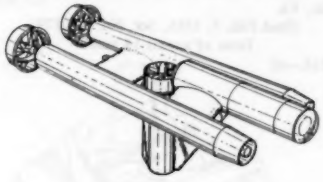
291,297
VEHICLE WHEEL CENTER
Donald J. Reid, Plymouth, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.
Filed Aug. 12, 1985, Ser. No. 764,823
Term of patent 14 years
U.S. Cl. D12—211



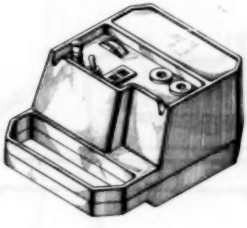
291,298
VEHICLE WHEEL CENTER
Donald J. Reid, Plymouth, Mich., assignor to Kelsey-Hayes Company, Romulus, Mich.
Filed Aug. 12, 1985, Ser. No. 764,827
Term of patent 14 years
U.S. Cl. D12—211



291,299
REMOTELY CONTROLLED UNDERWATER VEHICLE
Graham S. Hawkes, Oakland, Calif., assignor to Deep Ocean Engineering Incorporated, Oakland, Calif.
Filed Jul. 15, 1985, Ser. No. 754,757
Term of patent 14 years
U.S. Cl. D12—308



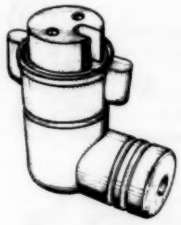
291,300
RECHARGEABLE STORAGE BATTERY
David B. Chaney, Powell, Ohio, assignor to Arcair Company, Lancaster, Ohio
Filed Oct. 18, 1984, Ser. No. 662,206
Term of patent 14 years
U.S. Cl. D13—8



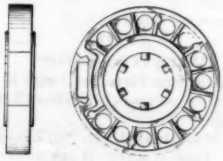
291,301
BATTERY TERMINAL EXTENDER OR SIMILAR ARTICLE
Odis B. Smothers, 718 N. 2nd St., Apt. A, Paragould, Ark. 72450
Filed Jul. 22, 1983, Ser. No. 516,377
Term of patent 14 years
U.S. Cl. D13—10

291,302
CABLE CONNECTOR
Helmut H. Lukas, Carleton Place, and Grant K. Pacey, Stittsville, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada
Filed May 31, 1985, Ser. No. 739,642
Term of patent 14 years
U.S. Cl. D13—24

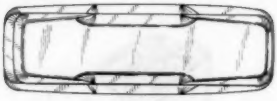
291,303
ELECTRICAL CONNECTOR PLUG
Jonathan M. Wood, Lilburn, Ga., and Robert R. Gibson, Eufaula, Ala., assignors to Techsonic Industries, Inc., Eufaula, Ala.
Filed Oct. 3, 1984, Ser. No. 657,152
Term of patent 14 years
U.S. Cl. D13—28

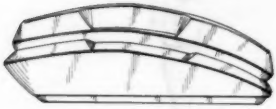


291,304
REEL HUB FOR CASSETTE TAPE
Kazumi Fujimoto, Hino, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Aug. 1, 1984, Ser. No. 636,560
Claims priority, application Japan, Feb. 16, 1984, 59-5433
Term of patent 14 years
U.S. Cl. D14—11

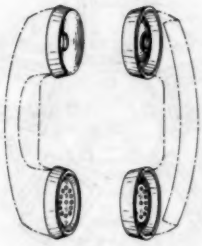


291,305
HOUSING FOR HANDSET TELEPHONE AND STAND UNIT
Michael A. Harrison, El Toro, and William R. Story, Mission Viejo, both of Calif., assignors to GTE Communication Systems Corporation, Northlake, Ill.
Filed Dec. 14, 1984, Ser. No. 681,477
Term of patent 14 years
U.S. Cl. D14—53

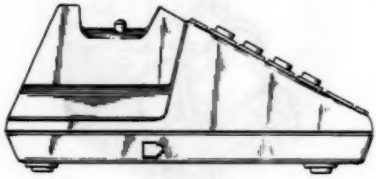




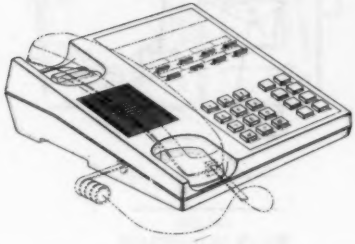
291,306
SANITARY COVER SET FOR TELEPHONE TRANSCOVER HANDSET
Gil Espinosa, 13641 E. Bailey, Whittier, Calif. 90650
Filed Dec. 3, 1985, Ser. No. 804,117
Term of patent 14 years
U.S. Cl. D14—59



291,307
TELEPHONE BASE
William Day, Jr., Charlottesville, and Craig B. Kelley, Earlysville, both of Va., assignors to Comdial Corporation, Charlottesville, Va.
Filed Feb. 7, 1985, Ser. No. 699,179
Term of patent 14 years
U.S. Cl. D14—60



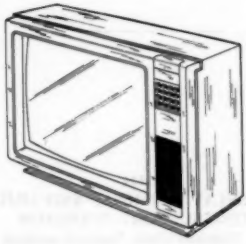
291,308
TELEPHONE SET BASE
Andreas Preussner, Highlands, N.J., and Jochen Fritzsche, Munich, Fed. Rep. of Germany, assignors to Siemens Corporate Research and Support, Inc., Iselin, N.J.
Filed Aug. 12, 1985, Ser. No. 765,028
Term of patent 14 years
U.S. Cl. D14—62



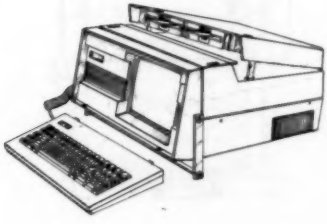
291,309
RECEPTACLE FOR TELEPHONE HANDSET
Kurt Kaufman, San Diego, Calif., assignor to TeleQuest, Inc., San Diego, Calif.
Filed Jun. 24, 1985, Ser. No. 747,874
Term of patent 14 years
U.S. Cl. D14—65

291,310
DIGITAL DISPLAY PAGER
Hiromi Ogura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan
Filed Sep. 4, 1984, Ser. No. 646,543
Claims priority, application Japan, Mar. 12, 1984, 59-9521
Term of patent 14 years
U.S. Cl. D14—68

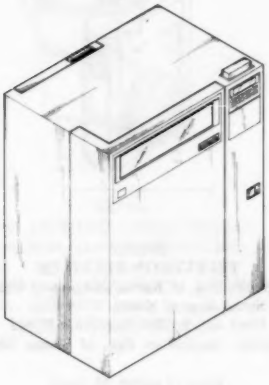
291,311
TELEVISION RECEIVER
Han S. Lee, Seoul, Rep. of Korea, assignor to Gold Star Company, Ltd., Seoul, Rep. of Korea
Filed Jul. 5, 1984, Ser. No. 627,902
Claims priority, application Rep. of Korea, Mar. 9, 1984, 2447-84
Term of patent 14 years
U.S. Cl. D14—80



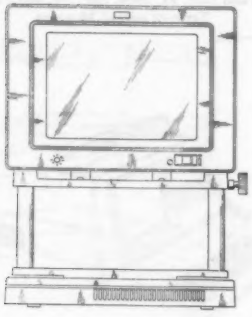
291,312
PORTABLE COMPUTER
Timothy J. Wiener, Sunnyvale, Calif., assignor to Zenith Electronics Corporation, Glenview, Ill.
Filed Dec. 11, 1984, Ser. No. 680,716
Term of patent 14 years
U.S. Cl. D14—106



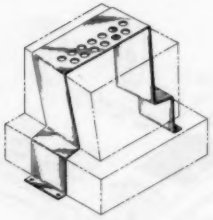
291,313
PRINTER
Jeffery W. Clark; Jeffery L. Quedenfeld, both of Endicott, and Paul A. Topencik, Endwell, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 29, 1984, Ser. No. 676,356
Term of patent 14 years
U.S. Cl. D14—111



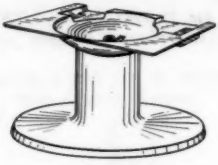
291,314
COMBINED DISPLAY TERMINAL AND ADJUSTABLE LIFTING SUPPORT THEREFOR
Michael H. Sharp, Palmhall Close, England, assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 27, 1984, Ser. No. 675,930
Claims priority, application United Kingdom, May 30, 1984, 1019969
Term of patent 14 years
U.S. Cl. D14—113



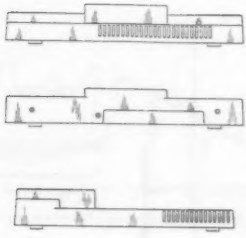
291,315
COMPUTER SECURITY BRACKET
Nelson R. Belford, 1140 Brighton St., Philadelphia, Pa. 19111, and Paul Blackman, 7252 Hanford St., Philadelphia, Pa. 19149
Filed Jun. 7, 1984, Ser. No. 618,067
Term of patent 14 years
U.S. Cl. D14—114



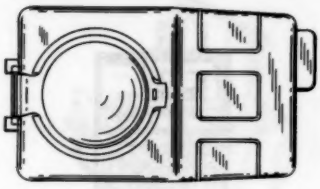
291,316
PEDESTAL FOR COMPUTER MONITORS
Douglas L. Johnston, Portland; Scott J. Peterson, Beaverton, and John E. Bales, Troutdale, all of Oreg., assignors to Comtek Industries, Inc., Portland, Oreg.
Filed Oct. 22, 1984, Ser. No. 663,565
Term of patent 14 years
U.S. Cl. D14—114



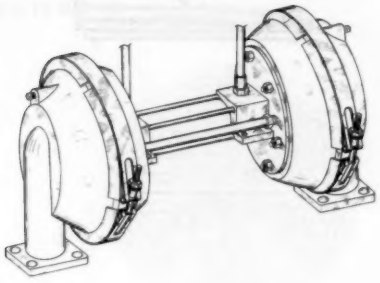
291,317
DATA PROCESSING LOGIC UNIT
Michael H. Sharp, Palmhall Close, England, assignor to International Business Machines Corporation, Armonk, N.Y.
Filed Nov. 27, 1984, Ser. No. 675,929
Claims priority, application United Kingdom, May 30, 1984, 1019972
Term of patent 14 years
U.S. Cl. D14—114



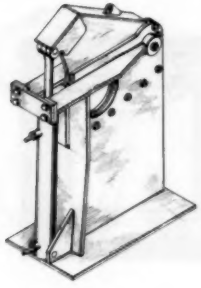
291,318
COMBINED TRACKBALL AND MOUSE
Syng N. Kim, Hoffman Estates, Ill., assignor to Wico Distribution Company, L.P., Niles, Ill.
Filed Jan. 14, 1985, Ser. No. 690,932
Term of patent 14 years
U.S. Cl. D14—114



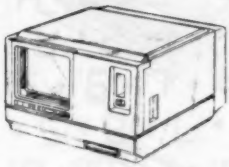
291,319
DIAPHRAGM PUMP
Cecil T. Hicks, 908 Cassandra Ave., Huntsville, Ala. 35802
Filed Aug. 10, 1984, Ser. No. 639,446
Term of patent 14 years
U.S. Cl. D15—7



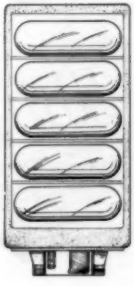
291,320
WOOD LOG SHEAR
Carroll T. Tostenson, 4650 Sierra Madre Dr. - No. 468, Reno, Nev. 89502, and Drusilla M. Tostenson, P.O. Box 153, Chilcoot, Calif. 96105
Filed Jun. 24, 1985, Ser. No. 748,093
Term of patent 14 years
U.S. Cl. D15—129



291,321
MICROFILM SCANNER
Tatsuo Kojima, Asaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed May 13, 1985, Ser. No. 733,370
Claims priority, application Japan, Nov. 15, 1984, 59-47251
Term of patent 14 years
U.S. Cl. D16—14

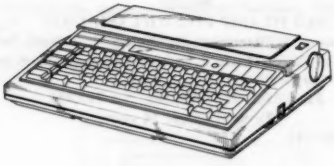


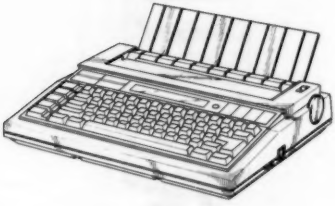
291,322
MULTILAMP PHOTOFLASH UNIT
Boyd G. Brower, Williamsport, Pa.; Emery G. Audesse, Beverly, and Dan E. Picini, Boxford, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.
Filed Mar. 20, 1985, Ser. No. 713,956
Term of patent 14 years
U.S. Cl. D16—42



291,323
TYPEWRITER
Taro Kasagi; Kenji Tamada, and Hideo Aoki, all of Tokyo, Japan, assignors to Silver Seiko Limited, Japan
Filed Sep. 5, 1985, Ser. No. 772,949
Claims priority, application Japan, Mar. 6, 1985, 60-008489
Term of patent 14 years
U.S. Cl. D18—1

291,324
TYPEWRITER
Isshin Miyamoto; Yasuo Nagamatsu; Yasuhiko Tanaka; Masaharu Sakamoto; Masataka Hidaka, and Hideaki Sakamoto, all of Fukuoka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed Dec. 10, 1985, Ser. No. 807,080
Term of patent 14 years
U.S. Cl. D18—1

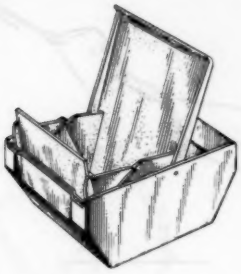




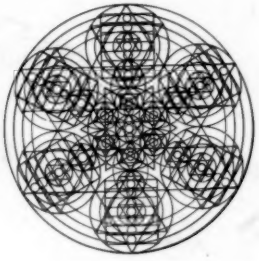
291,325
ELECTRONIC PRINTING CALCULATOR
Takahisa Yubisui, and Noriko Satake, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed May 3, 1985, Ser. No. 730,356
Claims priority, application Japan, Nov. 5, 1984, 59-45907
Term of patent 14 years
U.S. Cl. D18—7

291,326
TAGGING GUN
Barry S. Feierstein, and Jon A. Levy, both of Fairfield, Conn., assignors to Kwik Ticket Inc., New York, N.Y.
Filed Jul. 8, 1985, Ser. No. 752,828
Term of patent 14 years
U.S. Cl. D18—19

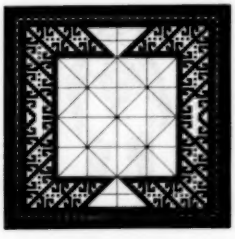
291,327
STORAGE CASE FOR DISKETTES
Craig D. Drake, and Ross A. Jessen, both of Muscatine, Iowa, assignors to Ring King Visibles, Inc., Muscatine, Iowa
Filed Dec. 31, 1984, Ser. No. 687,906
Term of patent 14 years
U.S. Cl. D3—35



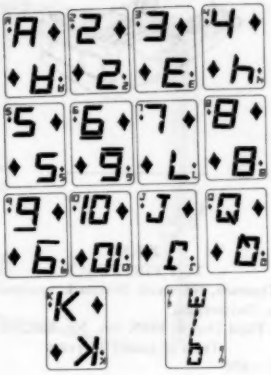
291,328
GAME BOARD
Willem F. Knotter, Avenue de 3 Verdun, F-26470 Bellegarde - en - dois, France
Filed Jan. 22, 1985, Ser. No. 693,241
Term of patent 14 years
U.S. Cl. D21—32



291,329
GAME BOARD
Iftekhar A. Khan, 518 Midland Dr., Norman, Okla. 73069
Filed Nov. 9, 1984, Ser. No. 670,282
Term of patent 14 years
U.S. Cl. D21—34

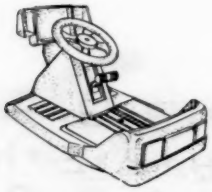


291,330
DECK OF PLAYING CARDS WITH SEGMENTED NUMBERS
Bill J. Raheb, Matawan, N.J., assignor to Old Bridge Playing Card Co., Inc., Matawan, N.J.
Filed Jun. 7, 1984, Ser. No. 618,129
Term of patent 14 years
U.S. Cl. D21—45

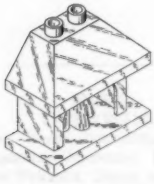


291,331
BALANCING NOVELTY DEVICE
Peter Holtsch, Taunusstein, Fed. Rep. of Germany, assignor to Holtsch Metallwarenherstellung, Taunusstein, Fed. Rep. of Germany
Filed May 17, 1984, Ser. No. 611,133
Term of patent 14 years
U.S. Cl. D21—59

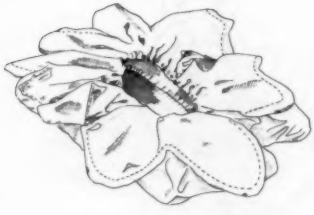
291,332
SIMULATIVE TOY VEHICLE
Ronald R. Klawitter, Hermann, Mo., assignor to Handi-Pac, Inc., Hermann, Mo.
Filed Jul. 2, 1984, Ser. No. 626,775
Term of patent 14 years
U.S. Cl. D21—76



291,333
TOY FIREPLACE
Sven C. B. Thomsen, Naestved, Denmark, assignor to Interlego A.G., Baar, Switzerland
Filed Dec. 4, 1985, Ser. No. 805,310
Term of patent 14 years
U.S. Cl. D21—108

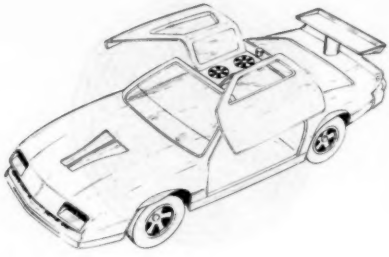


291,334
SIMULATIVE DOLL BED
Magda G. Jensen, 191 Berkely Ct., Iselin, N.J. 08830
Filed Mar. 7, 1985, Ser. No. 709,105
Term of patent 14 years
U.S. Cl. D21—121



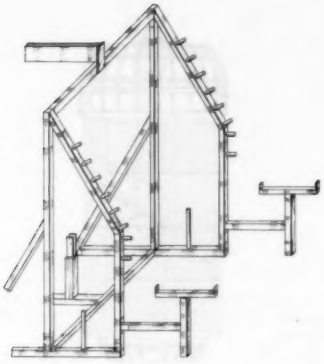
291,335
FISHING LURE
Roger B. Clement, 175 E. Center, Spanish Fork, Utah 84660
Filed May 23, 1985, Ser. No. 737,328
Term of patent 14 years
U.S. Cl. D22—129

291,336
TOY VEHICLE
Wayne Beiser; Howard N. Bollinger; Robert E. Cordrey; Charles E. Ligon; David A. Myers; Walter E. Stroud, all of Cincinnati, Ohio; W. Grey Williams, Covington, and Earl M. Wood, Jr., Newport, both of Ky., assignors to Kenner Parker Toys, Inc., Beverly, Mass.
Filed Feb. 6, 1985, Ser. No. 698,964
Term of patent 14 years
U.S. Cl. D21—136

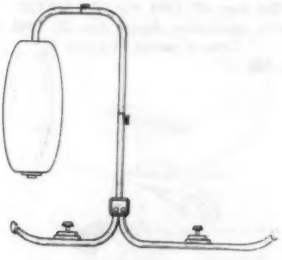


291,337
TOY SHEEP FIGURE
Judy E. Reid, P.O. Box 6, Babb, Mont. 59411
Filed Feb. 28, 1985, Ser. No. 706,634
Term of patent 14 years
U.S. Cl. D21—148

291,338
EXERCISE FRAME
David Ringel, 13 Ilene Ct., Belle Mead, N.J. 08502, and Kenneth Domzalski, 2250 Plainfield Ave. N., Piscataway, N.J. 08854
Filed Dec. 24, 1984, Ser. No. 686,270
Term of patent 14 years
U.S. Cl. D21—191



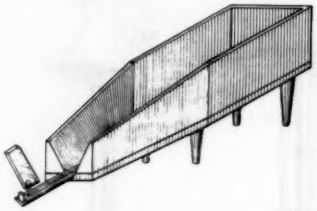
291,339
SKID MOUNTED PUNCHING BAG
David B. Charles, 39 Pinewood Ct., Walnut Creek, Calif. 94596
Filed Feb. 25, 1985, Ser. No. 705,079
Term of patent 14 years
U.S. Cl. D21—191



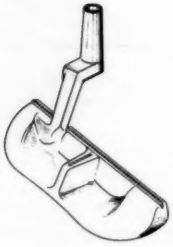
291,340
PHYSICAL EXERCISER
Marvin Cooper, New Rochelle, N.Y., assignor to Dynamic Classics Ltd., New York, N.Y.
Filed Jun. 12, 1985, Ser. No. 743,768
Term of patent 14 years
U.S. Cl. D21—195

291,341
HAND EXERCISER
Michael D. Keating, 6231 Sixth St. North, Oakdale, Minn. 55119, and Joseph D. Keating, 6634 Falstaff Rd., Woodbury, Minn. 55125
Filed Feb. 4, 1985, Ser. No. 698,090
Term of patent 14 years
U.S. Cl. D21—198

291,342
GOLF BALL DISPENSER
Howard M. Turnidge, 7729 Vista Verde Way, Sacramento, Calif. 95828, and Theodore Talvan, Redlands, Calif., assignors to Howard M. Turnidge, Sacramento, Calif.
Filed Sep. 28, 1984, Ser. No. 656,256
Term of patent 14 years
U.S. Cl. D21—208

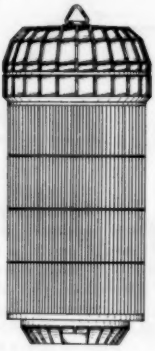


291,343
PUTTER HEAD
William B. Shearer, 2905 W. Main St., Muncie, Ind. 47305
Filed Oct. 19, 1984, Ser. No. 662,698
Term of patent 14 years
U.S. Cl. D21—219



291,344
SNOW SKI
Robert E. Jonsson, 3337 Monterey Ave., Davis, Calif. 95616
Filed Feb. 25, 1985, Ser. No. 704,847
Term of patent 14 years
U.S. Cl. D21—229

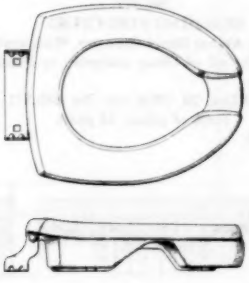
291,345
INSECT ELECTROCUTION LAMP
Mordechai Rottenberg, Raanana, Israel, assignor to Amcor Ltd., Tel Aviv, Israel
Filed Sep. 24, 1984, Ser. No. 653,188
Term of patent 14 years
U.S. Cl. D22—123



291,346
FISHING REEL
Masakazu Sakamoto, and Teruhisa Numata, both of Tokyo, Japan, assignors to Ryobi Limited, Hiroshima, Japan
Filed Aug. 30, 1984, Ser. No. 645,922
Claims priority, application Japan, Apr. 25, 1984, 59-17179
Term of patent 14 years
U.S. Cl. D22—140

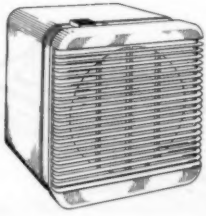
291,347
CHLORINATOR FOR WATER STORAGE SYSTEMS
Max L. Weaver, 1287 Husted Ave., San Jose, Calif. 95125; Michael G. Hill, 165 S. 17th St., San Jose, Calif. 95112, and John L. Cuha, 3045 Monterey Rd., San Jose, Calif. 95111
Filed Jul. 22, 1985, Ser. No. 757,264
Term of patent 14 years
U.S. Cl. D23—3

291,348
TOILET SEAT
David E. Harrison, Columbus, Miss., assignor to Sanderson Plumbing Products, Inc., Columbus, Miss.
Filed Jun. 17, 1985, Ser. No. 745,077
Term of patent 14 years
U.S. Cl. D23—71

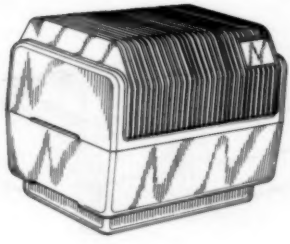


291,349
HEATING STOVE
Paul O'Reilly, Auburn, Australia, assignor to Cook on Gas Products Pty. Limited, Auburn, Australia
Filed Nov. 21, 1984, Ser. No. 673,609
Claims priority, application Australia, May 25, 1984, 7621/84
Term of patent 14 years
U.S. Cl. D23—97

291,350
PORTABLE ELECTRIC HEATER
Wilfred M. Sherman; Vernon M. Ellis, both of Boston, and Stephen R. Phillips, Newton, all of Mass., assignors to The Shetland Company, Inc., Chelsea, Mass.
Filed Mar. 20, 1985, Ser. No. 714,186
Term of patent 14 years
U.S. Cl. D23—122

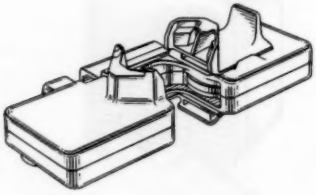


291,351
AIR CLEANER
Alfred Hitzler, Mochenwangen, Fed. Rep. of Germany, assignor to Biocomfort Produkte zur Gesundheitpflege GmbH, Esslingen, Fed. Rep. of Germany
Filed Apr. 24, 1985, Ser. No. 726,523
Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, GR 11 1077/84
Term of patent 14 years
U.S. Cl. D23—150

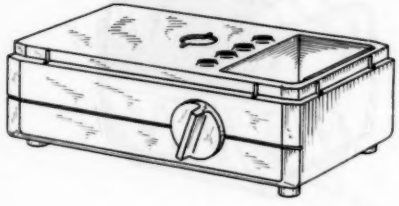


291,352
ELECTRIC FAN
Shuichi Kouno, Tokorozawa; Toshiyuki Utsuki, Tokyo; Hideki Sakae, Hino, and Kenichi Watanabe, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan
Filed Feb. 25, 1985, Ser. No. 704,726
Claims priority, application Japan, Nov. 2, 1984, 59-45115
Term of patent 14 years
U.S. Cl. D23—157

291,353
FLOW SENSOR FOR IV FLUID ADMINISTRATION
Ronald S. Conero, and Terry L. Landis, both of San Diego, Calif., assignors to IVAC Corporation, San Diego, Calif.
Filed Feb. 4, 1985, Ser. No. 698,166
Term of patent 14 years
U.S. Cl. D24—8



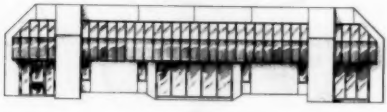
291,354
DENTAL WATER JET BASE
Murray I. C. Camens, Groningen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Feb. 19, 1985, Ser. No. 702,524
Claims priority, application World Int. Prop. O., Aug. 20, 1984, DM/004110
Term of patent 14 years
U.S. Cl. D24—16



291,355
ALCOHOL BREATH SIMULATOR FOR TESTING THE ACCURACY OF BREATH TESTERS
Edward S. Stanuch, Oak Forest, and Sigmund S. Urbanski, Alsip, both of Ill., assignors to Federal Signal Corporation, Oak Brook, Ill.
Filed Feb. 19, 1985, Ser. No. 702,689
Term of patent 14 years
U.S. Cl. D24—17

291,356
REFRESHMENT STAND
Ernest G. Sapieha, 1925-10A Street S.W., Calgary, Alberta, Canada T2T 3K2
Filed May 16, 1984, Ser. No. 611,029
Claims priority, application Canada, Nov. 30, 1983, 30-11-83-1
Term of patent 14 years
U.S. Cl. D25—10

291,357
BUILDING STRUCTURE
Patricia M. Able, Akron; David Brewster, Wadsworth, and Alex F. Sekely, Polk, all of Ohio, assignors to Ponderosa, Inc., Vandalia, Ohio
Filed Dec. 24, 1984, Ser. No. 685,571
Term of patent 14 years
U.S. Cl. D25—25



291,358

COMPACT SCREW-IN FLUORESCENT LAMP

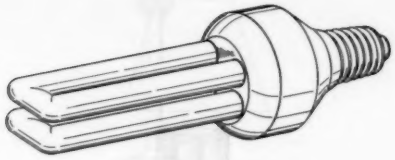
Dieter Witte, Lindenfels, Fed. Rep. of Germany, assignor to Osram GmbH, Munich, Fed. Rep. of Germany

Filed Sep. 11, 1985, Ser. No. 774,747

Claims priority, application Hague, Mar. 26, 1985, DM/004999

Term of patent 14 years

U.S. Cl. D26—3



291,359

PLANT LIGHT

Noel E. Zeller, 7 Brentwood Ave., White Plains, N.Y. 10605

Filed Aug. 9, 1985, Ser. No. 764,077

Term of patent 14 years

U.S. Cl. D26—60

291,360

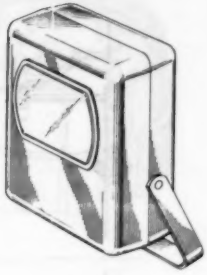
LUMINAIRE

Hendrik A. J. De Vos, and Elzear R. Labouliere, both of Swansea, Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Sep. 28, 1984, Ser. No. 655,187

Term of patent 14 years

U.S. Cl. D26—63



291,361

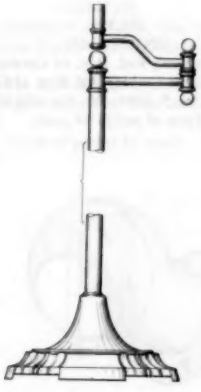
LAMP BASE

Terry Manton, Clifton, N.J., assignor to Westwood Lighting Group, Inc., Paterson, N.J.

Filed Feb. 28, 1985, Ser. No. 706,685

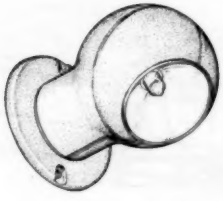
Term of patent 14 years

U.S. Cl. D26—63

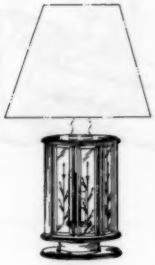


291,362
LAMP BASE
Terry Manton, Clifton, N.J., assignor to Westwood Lighting Group, Inc., Paterson, N.J.
Filed Apr. 30, 1985, Ser. No. 728,904
Term of patent 14 years
U.S. Cl. D26—63

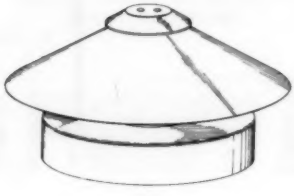
291,363
SPOT LAMP
Rudiger Schmidt, Bremen, Fed. Rep. of Germany, assignor to Ahlemann & Schlatter GmbH, Fed. Rep. of Germany
Filed Oct. 5, 1984, Ser. No. 658,319
Term of patent 14 years
U.S. Cl. D26—87



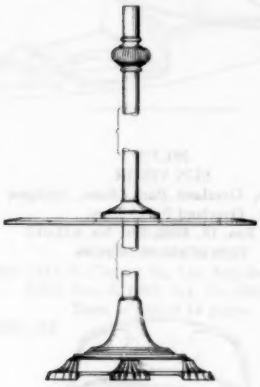
291,364
TABLE LAMP
Howard P. Shreve, Woodland Hills, Calif., assignor to Don Ward Industries, Inc., Van Nuys, Calif.
Filed Jul. 31, 1986, Ser. No. 891,702
Term of patent 14 years
U.S. Cl. D26—104



291,365
LAMP
Sean M. Corcorran, 436 Glade, Hayward, Calif. 94544, and Jorge L. Freyer, 73 W. 41st Ave., San Mateo, Calif. 94403
Filed Mar. 14, 1985, Ser. No. 711,656
Term of patent 14 years
U.S. Cl. D26—110

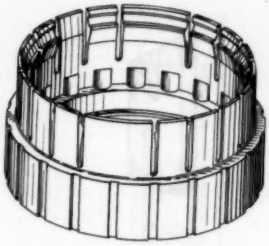


291,366
LAMP BASE
Terry Manton, Clifton, N.J., assignor to Westwood Lighting Group, Inc., Paterson, N.J.
Filed Apr. 30, 1985, Ser. No. 728,903
Term of patent 14 years
U.S. Cl. D26—110

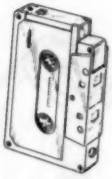


291,367
LAMP BASE
Terry Manton, Clifton, N.J., assignor to Westwood Lighting Group, Inc., Paterson, N.J.
Filed Apr. 30, 1985, Ser. No. 728,914
Term of patent 14 years
U.S. Cl. D26—110

291,368
FILTER HOLDER
John A. Letchford, Enfield, and Alex L. Halberstadt, London, both of England, assignors to THORN EMI plc, London, England
Filed Jul. 10, 1984, Ser. No. 629,433
Claims priority, application United Kingdom, Feb. 3, 1984, 1017705
Term of patent 14 years
U.S. Cl. D26—118



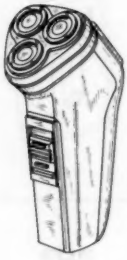
291,369
LIGHTER OR THE LIKE
Kaname Ichikawa, Tokyo, Japan, assignor to Modern Royal Co., Ltd., Tokyo, Japan
Filed Apr. 2, 1985, Ser. No. 719,153
Term of patent 14 years
U.S. Cl. D27—41



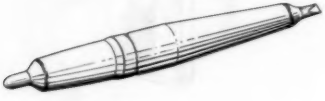
291,370
LIGHTER
Franz A. Stützer, Offenbach am Main, Fed. Rep. of Germany, assignor to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany
Filed Jul. 23, 1985, Ser. No. 758,110
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, 5 MR 10587
Term of patent 14 years
U.S. Cl. D27—36

291,371
LIGHTER
Franz A. Stützer, Offenbach am Main, Fed. Rep. of Germany, assignor to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany
Filed Jul. 23, 1985, Ser. No. 758,211
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1985, 5 MR 10587
Term of patent 14 years
U.S. Cl. D27—36

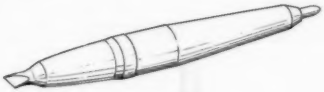
291,372
DRY SHAVER
Klaas T. Oord, and Olivier Sterk, both of Drachten, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Aug. 12, 1985, Ser. No. 764,375
Claims priority, application Benelux, Feb. 21, 1985, 59814-00
Term of patent 14 years
U.S. Cl. D28—50



291,373
NAIL POLISH PEN WITH CUTICLE STICK
George W. Korper, Dickerson, Md., assignor to Arche' Inc., Beltsville, Md.
Filed Jul. 15, 1985, Ser. No. 754,731
Term of patent 14 years
U.S. Cl. D28—57

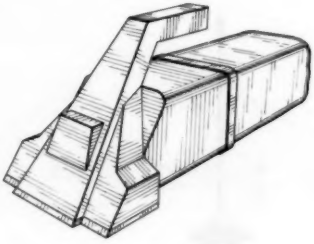


291,374
NAIL POLISH PEN WITH CUTICLE STICK
George W. Korper, Dickerson, Md., assignor to Arche' Inc., Beltsville, Md.
Filed Oct. 3, 1985, Ser. No. 782,295
Term of patent 14 years
U.S. Cl. D28—57

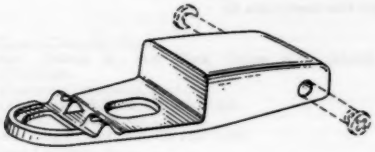


291,375
SUN VISOR
Stanley D. Cohen, Overland Park, Kans., assignor to Staco Enterprises, Inc., Overland Park, Kans.
Filed Jun. 18, 1984, Ser. No. 622,014
Term of patent 14 years
U.S. Cl. D29—18

291,376
PORTABLE VACUUM CLEANER
Michael W. Hetherington, Cedar Valley, Canada, assignor to Iona Appliances Inc./Appareils Iona Inc., Welland, Canada
Filed Mar. 5, 1985, Ser. No. 708,415
Term of patent 14 years
U.S. Cl. D32—18



291,377
VACUUM CLEANER STABILIZER
Joseph R. Warder, 1209 W. Avenue I, Lancaster, Calif. 93534
Filed Jan. 27, 1984, Ser. No. 574,727
Term of patent 14 years
U.S. Cl. D32—31



291,378
WINDOW WASHER
Israel Viner, 1411 N. Curson St., Los Angeles, Calif. 90046
Filed Dec. 6, 1985, Ser. No. 805,865
Term of patent 14 years
U.S. Cl. D32—41

291,379
AUTOMATED KIOSK FOR STOCK TRANSACTIONS
Peter S. Gengler, 24 Everett Ave., Providence, R.I. 02906; Benno Wissing, 89 State St., Bristol, R.I. 02809, and Paul Stephens, 210 Howell St., Providence, R.I. 02906
Filed Jun. 15, 1984, Ser. No. 620,903
Term of patent 14 years
U.S. Cl. D99—28

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF AUGUST, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Chance Company: *See*—
Parker, Delbert R.; and Clark, Daren A., 4,686,502, Cl. 337-252.000.

A-Lok Products Corporation: *See*—
Ditcher, Jack, 4,685,650, Cl. 249-83.000.

A. O. Smith Corporation: *See*—
Eising, John P., 4,685,425, Cl. 122-17.000.

A. T. Hunn Company: *See*—
Cunningham, Robert L.; Rhodes, Charles R.; Angotti, Carl; and Warner, Paul H., 4,686,439, Cl. 318-335.000.

Abbott Laboratories: *See*—
Eck, Paul L., 4,685,480, Cl. 134-182.000.
Freiberg, Leslie A.; and Bacino, David J., 4,686,207, Cl. 514-29.000.
Schweizer, Russell J., 4,685,910, Cl. 604-218.000.

Abe, Yuji: *See*—
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.

Abildgaard, William H., to Velo Bind, Inc. Bookbinding strips and method of binding books. 4,685,700, Cl. 281-21.00R.

Abney, Paul A.: *See*—
Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.

Abo, Toshimi; Ueno, Takashi; and Sumizawa, Akio, to Nissan Motor Co., Ltd. Control system for variable geometry turbocharger. 4,685,302, Cl. 60-602.000.

Abraham, Wolf-Rainer; Stumpf, Burkhard; and Kieslich, Klaus, to Gesellschaft fur Biotechnologische Forschung mbH (GBF). Process for the manufacture of p-menth-8-ene-1,2-diol. 4,686,183, Cl. 435-158.000.

Aciers et Outillage Peugeot: *See*—
Escaravage, Gerard, 4,685,177, Cl. 24-641.000.
Monsigny, Jean, 4,685,635, Cl. 242-107.40A.

Ackern, Klaus: *See*—
Forssmann, Bernd; Hepp, Wolfgang; Ackern, Klaus; and Chaussy, Christian, 4,685,461, Cl. 128-328.000.

Adam, Fritz G., to ITT Industries, Inc. CMOS memory cell having an electrically floating storage gate. 4,686,558, Cl. 357-42.000.

Adams, Neil R., to Advanced Micro Devices, Inc. Phase detector apparatus including charge pump means. 4,686,481, Cl. 328-133.000.

ADC Telecommunications, Inc.: *See*—
Pitsch, Daniel M., 4,685,755, Cl. 439-404.000.

Advanced Micro Devices, Inc.: *See*—
Adams, Neil R., 4,686,481, Cl. 328-133.000.
Haskell, Jacob D., 4,686,559, Cl. 357-54.000.
Wong, Thomas S., 4,686,452, Cl. 323-314.000.

Advanced Robotic Technology, Inc.: *See*—
Joyce, Stephen A., 4,686,329, Cl. 178-18.000.

AECI Limited: *See*—
Baker, Rodney C.; and Van Rensburg, Phillippus J., 4,685,423, Cl. 119-86.000.

Agency of Industrial Science and Technology: *See*—
Wada, Mitsuo; and Nishihara, Kazue, 4,685,349, Cl. 74-479.000.

Agfa-Gevaert N.V.: *See*—
De Keyzer, Rene M.; Vaes, Jos A.; and Berendsen, Jules R., 4,686,174, Cl. 430-502.000.
Vermeulen, Leon L.; Ghys, Theofiel H.; De Smedt, Willy P.; Vervloet, Ludovicus H.; and Callant, Paul R., 4,686,170, Cl. 430-244.000.

Agren, Magnus; and Nordqvist, Percy, deceased (by Nordqvist, Ulla, Per Nordquist, Patrik Nordqvist, heirs), to Molnlycke AB. Dressing and a method for the manufacture thereof. 4,685,907, Cl. 604-304.000.

Ahlf, Heinz-Jurgen; Guhne, Wieland; Simm, Hans-Peter; and Wulf, Peter, to Vorwerk & Co. Interholding GmbH. Bristle component for a floor cleaning nozzle. 4,685,170, Cl. 15-367.000.

Ahluwalia, Kawaljit S.: *See*—
Schroeder, Joseph W.; and Ahluwalia, Kawaljit S., 4,685,205, Cl. 29-727.000.

Ahmad, Mahmood; Sawyer, Albert J.; Schreiner, Wayne L.; and Thomas, Gerald H., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Processing sequence calls in a distributed control switching system. 4,686,701, Cl. 379-211.000.

Air Products and Chemicals, Inc.: *See*—
Kratz, Wilbur C.; and Sircar, Shivaji, 4,685,939, Cl. 55-25.000.

Aircraft Materials Limited: *See*—
Burnside, Martin B., 4,685,176, Cl. 24-631.000.

Airmaster Sales Ltd.: *See*—
Williamson, Wilfred G., 4,685,524, Cl. 172-54.500.

Aisan Kogyo Kabushiki Kaisha: *See*—
Ando, Tsuneo; Kasuya, Kazusato; Yasuda, Takeru; and Asada, Yukitoshi, 4,685,434, Cl. 123-438.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kato, Takayuki; and Miyamoto, Makoto, 4,686,453, Cl. 324-65.00R.
Miyata, Kinichi, 4,685,503, Cl. 164-14.000.

Aitken, Edward J.: *See*—
Mester, Zoltan C.; and Aitken, Edward J., 4,686,204, Cl. 502-406.000.

Aitken, William J.: *See*—
Steen, Wayne R.; and Aitken, William J., 4,685,841, Cl. 406-84.000.

Aizawa, Yasuhiro: *See*—
Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, 4,686,079, Cl. 376-444.000.

Akahane, Atsushi: *See*—
Ueda, Ikuo; Shiokawa, Youichi; Kato, Masayuki; Konishi, Nobukiyo; and Akahane, Atsushi, 4,686,227, Cl. 514-292.000.

Akers, Clifford B.: *See*—
Carroll, Thomas D.; and Akers, Clifford B., 4,686,592, Cl. 360-97.000.

Akiyama, Hideo: *See*—
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, 4,686,328, Cl. 174-153.00R.

AKZO NV: *See*—
Behnke, Joachim; and Pitowski, Hans-Jurgen, 4,686,044, Cl. 210-500.220.
Nollet, Andreas J. H.; Meijer, John; and Overkamp, Johannes W. A., 4,686,061, Cl. 252-95.000.
Vrouenraets, Cornelius M. F., 4,685,455, Cl. 128-156.000.

Alam, Aftab. Safety barrier. 4,685,247, Cl. 49-55.000.

Alcol, Ltd.: *See*—
Av-Zuk, Joseph, 4,685,258, Cl. 52-126.600.

Alcon Laboratories, Inc.: *See*—
Boltralik, John J., 4,686,214, Cl. 514-179.000.

Alexander, George E.; and Wilkinson, Stanley B., to General Electric Company. Ground distance relay for AC power transmission line protection. 4,686,601, Cl. 361-80.000.

Alfred Teves GmbH: *See*—
Belart, Juan; Burgdorf, Jochen; Weise, Lutz; and Seibert, Wolfram, 4,685,747, Cl. 303-114.000.
Weiler, Rolf, 4,685,686, Cl. 277-212.0FB.

Alkjaer, Peter, to V. Kann Rasmussen Industri A/S. Connection between the lower edge of a skylight and the adjacent roof covering. 4,685,256, Cl. 52-58.000.

Allaire, Michael J.: *See*—
Cartmell, James V.; Allaire, Michael J.; Burcham, Larry R.; and Patrick, Charles T., Jr., 4,685,467, Cl. 128-640.000.

Allan, Thomas T.; and Cramer, Robert V., to Flanders Filters, Inc. High efficiency particulate air filter. 4,685,944, Cl. 55-491.000.

Allard, Patrice: *See*—
Dodin, Andre; Siffert, Odile; Le Thuillier, Georgette; and Allard, Patrice, 4,686,281, Cl. 530-327.000.

Allcock, David, to Canadian Marconi Company. Crossed-drooping dipole antenna. 4,686,536, Cl. 343-700.0MS.

Allen-Bradley Company, Inc.: *See*—
Branc, Joseph R.; Merchant, Thomas J.; Miller, William L.; and Pisczak, Philip J., 4,685,303, Cl. 62-3.000.

Allen, David R. Hay rake assembly. 4,685,282, Cl. 56-377.000.

Allen Engineering Corporation: *See*—
Allen, J. Dewayne, 4,685,826, Cl. 404-114.000.

Allen, J. Dewayne, to Allen Engineering Corporation. Vibratory screed including a laterally displaceable oscillating strike-off. 4,685,826, Cl. 404-114.000.

Allied Corporation: *See*—
Anderson, Philip M.; and Reich, Ronald K., 4,685,234, Cl. 40-625.000.
Anderson, Philip M.; Ujazdowski, Richard C.; and Urbanski, Jeffrey C., 4,686,515, Cl. 340-572.000.
Brown, Arthur K., Jr., 4,685,297, Cl. 60-547.100.
Colpaert, James J., 4,685,542, Cl. 188-72.300.
Fulmer, Keith H.; and Baker, Donald J., 4,685,491, Cl. 138-31.000.
Homonoff, Edward C.; Rodman, Clarke A.; and Rutledge, Broaddus L., II, 4,686,136, Cl. 428-286.000.
Myers, Lawrence R.; and Gaiser, Robert F., 4,685,299, Cl. 60-547.100.
Samuels, George J.; and Garman, Joseph M., 4,686,015, Cl. 204-15.000.
Schrieber, Ricky J., 4,686,632, Cl. 364-518.000.
Schrieber, Ricky J., 4,686,633, Cl. 364-523.000.
Schrieber, Ricky J., 4,686,634, Cl. 364-523.000.

Schrieber, Ricky J., 4,686,635, Cl. 364-523.000.
Schrieber, Ricky J., 4,686,636, Cl. 364-523.000.
Shia, George A.; and Friedland, David J., 4,686,161, Cl. 429-50.000.
Steer, John E., 4,685,300, Cl. 60-562.000.

Allison, Anthony C.: *See*—
Nelson, Peter H.; Allison, Anthony C.; and Eugui, Elsie M., 4,686,234, Cl. 514-469.000.

Alpha-Omega Engineering, Inc.: *See*—
Smith, Stephen F., 4,686,705, Cl. 455-109.000.

Alsthom: *See*—
Goy, Pierre, 4,685,188, Cl. 29-446.000.

Aluminum Company of America: *See*—
Brown, Melvin H., 4,685,514, Cl. 165-177.000.
Bush, J. Finley; and Mydock, Donald R., 4,686,198, Cl. 502-25.000.
Clowes, Ernest J., 4,685,322, Cl. 72-348.000.
LaBarge, Robert L.; and Heffner, Robert E., 4,685,849, Cl. 413-22.000.
Truckner, William G.; Jordan, Charles L.; and Sharkins, William R., 4,685,505, Cl. 164-415.000.
Warchol, Mark F. A., 4,685,325, Cl. 73-19.000.

Amano, Itaru: *See*—
Yokoyama, Kageki; and Amano, Itaru, 4,686,129, Cl. 425-47.000.

Amano, Kenichiro: *See*—
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Kiuchi, Masayoshi; and Amano, Kenichiro, 4,685,789, Cl. 354-173.110.

Amano, Takehiro: *See*—
Migita, Yoshihiro; Eguchi, Tadashi; Kumazawa, Yukinari; Nakagami, Jozi; Amano, Takehiro; Sota, Kaoru; and Sakakibara, Jinsaku, 4,686,292, Cl. 544-343.000.

Amano, Toshihiko: *See*—
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Amco Corporation: *See*—
Kulbersh, Irwin, 4,685,575, Cl. 211-90.000.

American Can Company: *See*—
Caner, Ali R.; and Spencer, Kenneth B., 4,685,273, Cl. 53-440.000.
Schaefer, Suzanne E.; and Eckstein, John P., 4,685,591, Cl. 222-107.000.

American Cast Iron Pipe Company: *See*—
Conner, Randall C.; and Walworth, Van T., 4,685,708, Cl. 285-374.000.

American Cyanamid Company: *See*—
Medwid, Jeffrey B.; Torley, Lawrence W.; and Tomcufcik, Andrew S., 4,686,220, Cl. 514-252.000.
Meek, John T.; and Stockton, Gerald W., 4,686,365, Cl. 250-281.000.
Ritchey, Mary B.; Cano, Francis R.; O'Hara, Gerald J.; English, James D.; and Lin, Wenlii, 4,686,102, Cl. 424-92.000.

American Gas Association: *See*—
Priem, Richard J.; Ghassemzadeh, M. Reza; and Griffiths, James C., 4,685,510, Cl. 165-62.000.

American Home Products Corporation: *See*—
Ferdinandi, Eckhardt S.; Mobilio, Dominick; Sabatucci, Joseph P.; and Humber, Leslie G., 4,686,213, Cl. 514-161.000.

American Home Products Corporation (Del.): *See*—
King, Gary A., 4,686,225, Cl. 514-283.000.

American Hospital Supply Corporation: *See*—
Cartmell, James V.; Allaire, Michael J.; Burcham, Larry R.; and Patrick, Charles T., Jr., 4,685,467, Cl. 128-640.000.
Meguro, Jun-Ichi; Solberg, Arne L.; Stark, William A.; and Hsei, Paul K., 4,685,880, Cl. 425-416.000.

American Standard Inc.: *See*—
Derdack, Dieter; and Delker, Wilfried, 4,685,487, Cl. 137-315.000.

American Tech Manufacturing, Inc.: *See*—
Linker, Frank V., Jr.; and Shuren, Thomas E., 4,686,637, Cl. 364-550.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Ahmad, Mahmood; Sawyer, Albert J.; Schreiner, Wayne L.; and Thomas, Gerald H., 4,686,701, Cl. 379-211.000.
Capasso, Federico; and Cho, Alfred Y., 4,686,550, Cl. 357-16.000.
Chang, Shih-Jeh, 4,686,669, Cl. 370-54.000.
Ng, Fred K., 4,686,620, Cl. 364-200.000.

American Television & Communications Corp.: *See*—
Masuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, 4,686,564, Cl. 358-86.000.

American Toxic Disposal Partners: *See*—
Meenan, William C.; and Sullivan, George D., 4,685,220, Cl. 34-10.000.

Amerock Corporation: *See*—
Roehrig, Phillip J.; and Gray, Neal R., 4,685,347, Cl. 74-436.000.

Amidon, Gordon L.; Higuchi, Takeru; and Dressman, Jennifer B., to Merck & Co., Inc. Lipid osmotic pump. 4,685,918, Cl. 604-892.000.

Amoco Corporation: *See*—
Levan, Chris D., 4,686,123, Cl. 427-424.000.
Mount, Houston B., II, 4,685,294, Cl. 60-329.000.
Qureshi, Shahid P., 4,686,250, Cl. 523-440.000.
Schulz, David A.; and Nelson, Loren C., 4,686,096, Cl. 423-447.100.

Amor, Max: *See*—
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,685,473, Cl. 128-772.000.

AMP Incorporated: *See*—
Coldren, Daniel R., 4,685,754, Cl. 439-270.000.
Denlinger, Keith R.; Rudy, William J., Jr.; and Stahl, Daniel E., 4,685,886, Cl. 439-55.000.
Hoffer, John C.; Caron, Bernard G.; and Rupert, Martin R., 4,685,764, Cl. 350-96.200.
Hoffman, Norman E.; and Oberman, Carl D., 4,686,333, Cl. 200-6.00B.
Locati, Ronald P., 4,685,761, Cl. 439-843.000.

Amsel, Klaus: *See*—
Moravek, Peter; Trebitz, Bernd; Weller, Albrecht; and Amsel, Klaus, 4,685,229, Cl. 38-84.000.

Amundson, Anita L.; and Tokay, Joseph. Shopping cart caddy. 4,685,701, Cl. 281-42.000.

ANA Tech Corporation: *See*—
Spehrley, Charles W., Jr.; Schneider, Gary W.; Lipkie, Curtis A.; and Cranston, Dean H., 4,686,581, Cl. 358-294.000.

Analog Devices, Incorporated: *See*—
Bokil, Delip R., 4,685,200, Cl. 437-215.000.

Anderson, Herbert L.; Kinnison, W. Wayne; and Lillberg, John W., to United States of America, Energy. Apparatus and method for reading two-dimensional electrophoretograms containing β-ray-emitting labeled compounds. 4,686,368, Cl. 250-374.000.

Anderson, Ian J.: *See*—
Lusk, Norman E.; and Anderson, Ian J., 4,685,378, Cl. 89-14.500.

Anderson, Lloyd L., to Iowa State University Research Foundation, Inc. Method of managing cattle breeding herds. 4,686,103, Cl. 424-97.000.

Anderson, Neil G.: *See*—
Harris, Robert M.; and Anderson, Neil G., 4,685,412, Cl. 114-238.000.

Anderson, Paul L., to Sandoz Pharmaceuticals Corp. Erythro-(E)-7-[3'-C_1-3alkyl-1'-(3'',5''-dimethylphenyl)naphth-2'-yl]-3,5-dihydroxyhept-6-enoic acids and derivatives thereof. 4,686,237, Cl. 514-532.000.

Anderson, Philip M.; and Reich, Ronald K., to Allied Corporation. Surveillance marker clip assembly. 4,685,234, Cl. 40-625.000.

Anderson, Philip M.; Ujazdowski, Richard C.; and Urbanski, Jeffrey C., to Allied Corporation. Apparatus and method for marker verification. 4,686,515, Cl. 340-572.000.

Anderson, Richard N., to Hunter Douglas, Inc. Method of making honeycomb structure with joined single pleat material. 4,685,986, Cl. 156-197.000.

Anderson, Robert O.: *See*—
Seider, Robert J.; Guichelaar, Philip J.; and Anderson, Robert O., 4,686,032, Cl. 209-8.000.

Anderson, Ronald L.; and Kessler, Harry T., Jr. Machine for orientating and delivering tapered articles. 4,685,552, Cl. 198-389.000.

Anderson, W. Lee: *See*—
Violett, Robert S.; and Anderson, W. Lee, 4,685,289, Cl. 60-269.000.

Ando, Eiji: *See*—
Yoshino, Kimiaki; Ando, Eiji; Miyazaki, Jinsei; and Morimoto, Kazuhisa, 4,686,169, Cl. 430-339.000.

Ando, Kunio, to Fuji Photo Optical Co., Ltd. Endoscope apparatus using solid state image pickup device. 4,685,451, Cl. 128-6.000.

Ando, Moritoshi, to Fujitsu Limited. Method and apparatus for visually examining an array of objects disposed in a narrow gap. 4,686,565, Cl. 358-101.000.

Ando, Tsuneo; Kasuya, Kazusato; Yasuda, Takeru; and Asada, Yukitoshi, to Aisan Kogyo Kabushiki Kaisha. Electric control apparatus for carburetor. 4,685,434, Cl. 123-438.000.

Anger, Wolfgang. Insole. 4,685,224, Cl. 36-43.000.

Angerbauer, Rolf; Boberg, Michael; Metzger, Karl G.; and Zeiler, Hans-Joachim, to Bayer Aktiengesellschaft. 7-[2-(2-aminothiazol-4-yl)-2-oximino-acetamido-3-quaternary-ammonium-methyl-3-cephem-4-carboxylates. 4,686,216, Cl. 514-202.000.

Anglard, Andre: *See*—
Mace, Guy; Anglard, Andre; and Insa, Andre, 4,685,377, Cl. 89-1.540.

Angott, Paul G. Remote on/off switch circuit. 4,686,380, Cl. 307-125.000.

Angotti, Carl: *See*—
Cunningham, Robert L.; Rhodes, Charles R.; Angotti, Carl; and Warner, Paul H., 4,686,439, Cl. 318-335.000.

Angus, James P.; and Perry, Derick A., to Rolls-Royce plc. Hollow aerofoil blade. 4,685,864, Cl. 416-229.00R.

Anico Research, Ltd. Inc.: *See*—
Farago, Steven, 4,686,506, Cl. 340-347.0DD.

Anitec Image Corporation: *See*—
Resnick, Bruce M.; and Wexler, Allan J., 4,686,167, Cl. 430-264.000.

Antos, Ronald L.: *See*—
Yip, Kwok-Leung; Antos, Ronald L.; and Herloski, Robert P., 4,686,542, Cl. 346-108.000.

Aoki, Kozo; Ono, Michio; Saito, Naoki; and Umemoto, Makoto, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive materials. 4,686,177, Cl. 430-553.000.

Aoki, Kyoji: *See*—
Iriuchijima, Shinobu; Kobayashi, Hirohiko; Aoki, Kyoji; Oda, Takeshi; Shinoyama, Masayuki; and Nosaka, Yoshifumi, 4,686,296, Cl. 548-544.000.

Aoki, Masaki: *See*—
Kuribayashi, Kiyoshi; Sakai, Masayuki; Monji, Hideto; Aoki, Masaki; Okinaka, Hideyuki; and Torii, Hideo, 4,685,948, Cl. 65-26.000.

Aonuma, Masashi; Watanabe, Hideomi; Miyoshi, Takahito; and Okita, Tsutomu, to Fuji Photo Film Co., Ltd. Magnetic recording medium and method of preparing. 4,686,149, Cl. 428-522.000.

Aoyagi, Koshiro; Nishino, Taneharu; and Betsuki, Kenji, to Nippon Steel Corporation. Rolling method and apparatus for forming sections having flange. 4,685,319, Cl. 72-234.000.

Ap, Ngy S., to VALEO. Motor vehicle exhaust gas heat exchanger for heating engine coolant and lubricating oil. 4,685,430, Cl. 123-142.50R.

APTI, Inc.: *See*—
Eastlund, Bernard J., 4,686,605, Cl. 361-231.000.

ARA-Werk Kraemer GmbH & Co.: *See*—
Segatz, Wilhelm, 4,685,595, Cl. 222-326.000.

Arai, Minoru: *See*—
Ohe, Takeshi; Taniguchi, Yoshiaki; and Arai, Minoru, 4,686,438, Cl. 318-280.000.

Arai, Ryuichi; and Sakaki, Mamoru, to Canon Kabushiki Kaisha. Recording medium and recording method by use thereof. 4,686,118, Cl. 427-261.000.

Arai, Tohru; and Endo, Junji, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Method of forming a carbide layer. 4,686,117, Cl. 427-249.000.

Arakawa, Shunsuke; and Shitori, Kunio, to Hitachi Metals, Ltd. Method for welding amorphous wound cores. 4,686,347, Cl. 219-117.100.

Araki, Tetsuro; and Onda, Hiroyuki, to Teac Corporation. Digital to analog conversion method and system with the introduction and later removal of dither. 4,686,509, Cl. 340-347.0DA.

Archer, William R., to General Electric Company. Electronic control circuit, electronically commutated motor system and method for controlling same, laundry apparatus, and methods for operating apparatus for switching high voltage DC and for controlling electrical load powering apparatus. 4,686,436, Cl. 318-254.000.

Arimoto, Shinobu, to Canon Kabushiki Kaisha. Original reading apparatus with positioning check. 4,686,577, Cl. 358-256.000.

Armah, Ben: *See*—
Cohnen, Erich; and Armah, Ben, 4,686,223, Cl. 514-272.000.

Armco Inc.: *See*—
Kilbane, Farrell M.; and Dunbar, F. Curtiss, 4,686,155, Cl. 428-653.000.

Armstrong, Bruce G.; and Principi, Fabio, to Raytheon Company. Power switched read-only memory. 4,686,651, Cl. 365-226.000.

Arnaud, Johnny, to Hydrotreat, Inc. Filter apparatus. 4,686,038, Cl. 210-232.000.

Arnberg, Peter W. Laser plane apparatus for measuring characteristics of traffic-bearing surfaces. 4,685,806, Cl. 356-376.000.

Arnold, G.: *See*—
Powers, Steven J., 4,685,213, Cl. 30-123.000.

Arnold Muller GmbH & Co KG: *See*—
Wurst, Karl-Heinz, 4,686,402, Cl. 310-83.000.

Aros Hydraulik GmbH: *See*—
Lochner, Kaspar; Schurmann, Helmut; and Brand, Erich, 4,686,057, Cl. 252-62.000.

Arots, Joseph B., to Calgon Corporation. Process for detackification of paint spray operation wastes. 4,686,047, Cl. 210-712.000.

Arthun, Nils: *See*—
Lofgren, Peter; and Arthun, Nils, 4,685,494, Cl. 141-65.000.

Aruga, Masayoshi: *See*—
Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, 4,685,911, Cl. 604-897.000.

Asada, Yukitoshi: *See*—
Ando, Tsuneo; Kasuya, Kazusato; Yasuda, Takeru; and Asada, Yukitoshi, 4,685,434, Cl. 123-438.000.

Asahi Glass Company Ltd.: *See*—
Oda, Yoshio; Asawa, Tatsuro; Sato, Kimihiko; and Sajima, Yasuo, 4,686,026, Cl. 204-252.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Yoshino, Akira; and Sanechika, Kenichi, 4,686,160, Cl. 429-50.000.

Asakawa, Hiroshi: *See*—
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Asano, Hideo, to International Business Machines Corporation. GII/-GIII transmission system. 4,686,578, Cl. 358-280.000.

Asano, Toshiaki: *See*—
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.

Asawa, Tatsuro: *See*—
Oda, Yoshio; Asawa, Tatsuro; Sato, Kimihiko; and Sajima, Yasuo, 4,686,026, Cl. 204-252.000.

Ascolese, Salvatore J.: *See*—
Filiz, Alain; and Ascolese, Salvatore J., 4,685,558, Cl. 206-1.500.

Aseco Corporation: *See*—
Lee, Kenneth R.; and Kallander, Ernest L., Jr., 4,686,468, Cl. 324-158.00F.

Aseltine, Richard G., Jr.: *See*—
Shapiro, L. Dennis; and Aseltine, Richard G., Jr., 4,686,697, Cl. 379-38.000.

Ashimori Industry Co., Ltd.: *See*—
Hyodo, Masakatsu; Kusumoto, Koji; and Sokawa, Takuji, 4,686,126, Cl. 428-36.000.

Ashton, Michael C., to Steel Castings Research and Trade Association. Reclamation of foundry sands. 4,685,973, Cl. 134-13.000.

Ashworth Bros., Inc.: *See*—
Roinestad, Gerald C., 4,685,557, Cl. 198-834.000.

Assaf, Gad, to Geophysical Engineering Company. Method of and apparatus for conditioning air in enclosures. 4,685,617, Cl. 237-81.000.

Astapenok, Elena B.: *See*—
Kalvinsh, Ivars Y.; and Astapenok, Elena B., 4,686,215, Cl. 514-183.000.

Atherton, Geroge A.; Dickakian, Ghazi B.; and Grant, Edward D., Jr., to Exxon Research & Engineering Co. Process for treating cat cracker bottoms sludge. 4,686,048, Cl. 210-771.000.

Atkins, John W.: *See*—
Hagerman, Gene R.; Atkins, John W.; and McMurtry, John G., 4,685,671, Cl. 272-139.000.

Atkinson, Joseph G.; Baldwin, John J.; and McClure, David E., to Merck & Co., Inc.; and Merck Sharp & Dohme (I.A.) Corp. Aralkylaminoethanol heterocyclic compounds. 4,686,222, Cl. 514-255.000.

Atlantic Richfield Company: *See*—
Smith, Lonnie J.; Blount, Curtis G.; and Petermann, Steven G., 4,685,516, Cl. 166-65.100.

Atrium Structures, Inc.: *See*—
Jenn, Louis J., 4,685,260, Cl. 52-169.300.

Attenborough, Colin, to Plessey Overseas Limited. Fractional N frequency synthesizer with modulation compensation. 4,686,488, Cl. 331-2.000.

Aubry, Jean P.: *See*—
Debaisieux, Andre ; and Aubry, Jean P., 4,686,324, Cl. 174-17.050.

Aunger, Kim Garfield: *See*—
Gaston, Ronald, 4,685,717, Cl. 296-97.00A.

Auschrat, Siegfried, to Sihi GmbH & Co. KG. Liquid ring compressor having openings in housing for emptying liquid during stoppage. 4,685,865, Cl. 417-68.000.

Austin, Gerald W., to Professional Care Products, Inc. External single-use catheter. 4,685,913, Cl. 604-349.000.

Av-Zuk, Joseph, to Alcol, Ltd. Access flooring system with increased load capacity. 4,685,258, Cl. 52-126.600.

Avery International Corporation: *See*—
Powers, Carol C.; and Lare, Donald W., 4,685,984, Cl. 156-155.000.

AWA Engineering Co., Ltd.: *See*—
Kubo, Toyohide, 4,685,187, Cl. 29-434.000.

Azuma, Shizuo; Hiramatsu, Toshiyuki; Nakagawa, Koji; and Ichikawa, Yataro, to Teijin Limited. Benzoylaminoalkylenephosphonic acids or esters thereof, herbicidal compositions containing same and their herbicidal use. 4,685,952, Cl. 71-86.000.

B. F. Goodrich Company, The: *See*—
Lochhead, Robert Y.; and Warfield, Debra S. S., 4,686,254, Cl. 524-99.000.

Baba, Saburo: *See*—
Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, 4,686,135, Cl. 428-265.000.

Babcock & Wilcox Company, The: *See*—
Kidaloski, Raymond G.; Olinger, Harry S.; and Bryk, Stephen A., 4,685,426, Cl. 122-214.000.
Latimer, Paul J., 4,685,334, Cl. 73-599.000.

Bacardit, Juan S., to Bendiberica S.A. System for generating braking pressure. 4,685,298, Cl. 60-547.100.

Bacardit, Juan S.; and Folch, Carlos M., to Bendiberica S.A. Hydraulic pressure generator. 4,685,301, Cl. 60-562.000.

Bacher, Michel: *See*—
Carmillet, Roger; Graton, Michel; and Bacher, Michel, 4,685,896, Cl. 464-68.000.

Bacino, David J.: *See*—
Freiberg, Leslie A.; and Bacino, David J., 4,686,207, Cl. 514-29.000.

Backlund, Stephen J.; and Olsen, Robert E., to United States of America, America. Carbamate compounds. 4,686,304, Cl. 560-25.000.

Badger Northland, Inc.: *See*—
Smith, Robert W., 4,685,555, Cl. 198-731.000.

Baeger, Holm, to VDO Adolf Schindling AG. Display device, particularly a liquid crystal display, and method for the manufacture thereof. 4,685,770, Cl. 350-344.000.

Baer, James W., to Storage Technology Partners II. Subaperture coarse tracking optical system for optical data storage devices. 4,686,662, Cl. 369-44.000.

Baggett, Jay W., to UPCO, Inc. Pressure differential plunger. 4,685,517, Cl. 166-105.000.

Bailey, Frederick E., Jr.; Jorgenson, Michael W.; and Whitman, Robert D., to Union Carbide Corporation. Process for producing polyurethane foams using foam modifiers. 4,686,240, Cl. 521-103.000.

Bains, William R., to Ford Aerospace & Communications Corp. Pneumatically actuated ram air steering system for a guided missile. 4,685,639, Cl. 244-3.220.

Baker, Alan J. Method of averaging a plurality of measured modulo values. 4,686,510, Cl. 340-347.00P.

Baker, Donald J.: *See*—
Fulmer, Keith H.; and Baker, Donald J., 4,685,491, Cl. 138-31.000.

Baker, Dorian R. W. Intermodal transport. 4,685,399, Cl. 105-4.100.

Baker, Rodney C.; and Van Rensburg, Phillippus J., to AECI Limited. Insecticidal grooming article. 4,685,423, Cl. 119-86.000.

Baker, Roger C.: *See*—
Pollard, Geoffrey J.; and Baker, Roger C., 4,685,811, Cl. 366-275.000.

Balaban, Alvin R.; Patel, Chandrakant B.; Demmer, Walter H.; and Harwood, Leopold A., to RCA Corporation. Phase locked loop system including analog and digital components. 4,686,560, Cl. 358-19.000.

Balazs, Michael A., to Boca Raton Hotel and Club. Collapsible support for food screen. 4,685,483, Cl. 135-102.000.

Baldini, Luciano; and Siccardi, Alberto, to Bieffe S.p.A. Sterilizable valvular systems for flexible containers. 4,685,917, Cl. 604-411.000.

Baldoni, J. Gary, II; and D'Angelo, Charles, to GTE Service Corporation. Coated cemented carbide cutting tool. 4,686,156, Cl. 428-698.000.

Baldwin, John J.: *See*—
Atkinson, Joseph G.; Baldwin, John J.; and McClure, David E., 4,686,222, Cl. 514-255.000.
Huff, Joel R.; Baldwin, John J.; Sakurai, Yojiro; Vacca, Joseph P.; and Guare, James P., Jr., 4,686,226, Cl. 514-285.000.

Ball Corporation: *See*—
Lalezari, Farzin, 4,686,535, Cl. 343-700.0MS.

Ballard, Michael J. Dynamic seal. 4,685,684, Cl. 277-57.000.

Bally Manufacturing Corporation: *See*—
Frederiksen, Jeffrey E., 4,685,678, Cl. 273-148.00B.

Banerjea, Tara N., to Monon Corporation. Plate trailer. 4,685,721, Cl. 296-181.000.

Banno, Takuo, to Hewlett-Packard Company. Method for measuring a signal's frequency components. 4,686,457, Cl. 324-77.00R.

Baranet, Sandra E.; Hodge, Richard M.; and Kucera, Clare H., to Dowell Schlumberger Incorporated. Stabilized fracture fluid and crosslinker therefor. 4,686,052, Cl. 252-8.551.

Baranyi, Sandor J., to Eaton Corporation. Printing apparatus. 4,685,815, Cl. 400-120.000.

Bard, Arnold D. Joystick control unit. 4,686,361, Cl. 250-221.000.

Barmag AG: *See*—
Stitz, Albert, 4,685,637, Cl. 242-157.00R.

Barnes Drill Co.: *See*—
Estabrook, Mark R., 4,686,035, Cl. 210-137.000.

Barnes, Russell M.: *See*—
Young, Raymond R.; Deffner, John F.; and Barnes, Russell M., 4,685,574, Cl. 211-59.200.

Baron, Kenneth: *See*—
Jessup, Peter; Holstedt, Richard A.; and Baron, Kenneth, 4,686,056, Cl. 252-49.700.

Barrett, William T., to Wehr Corporation. Magnetic refuse separator. 4,686,034, Cl. 209-223.100.

Barriere, Jean-Claude; Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, to Rhone-Poulenc Sante. 3-phenyl-2-propeneamine derivatives, their preparation and compositions containing them. 4,686,309, Cl. 564-355.000.

Barry, Michael W.: *See*—
Tompkins, E. Neal; Riley, Kim K.; Bartholmae, Jack N.; and Barry, Michael W., 4,686,698, Cl. 379-53.000.

Bartholmae, Jack N.: *See*—
Tompkins, E. Neal; Riley, Kim K.; Bartholmae, Jack N.; and Barry, Michael W., 4,686,698, Cl. 379-53.000.

Bartos, Dezso S.; and Fitzpatrick, Denis, to Bartos Patent Development & Holding Company, Limited. Serioimmunological process for determining the in-vivo effectiveness of cytostatic agents. 4,686,194, Cl. 436-536.000.

Bartos Patent Development & Holding Company, Limited: *See*—
Bartos, Dezso S.; and Fitzpatrick, Denis, 4,686,194, Cl. 436-536.000.

BASF Aktiengesellschaft: *See*—
Broecker, Franz J., 4,686,202, Cl. 502-300.000.
Merger, Franz; and Schwarz, Wolfgang, 4,686,302, Cl. 558-314.000.

BASF Corporation: *See*—
Schwartz, Ellen S.; Davis, Pauls; and Maxwell, Jerrold F., 4,686,058, Cl. 252-75.000.

BASF Farben + Fasern AG: *See*—
Diefenbach, Horst; and Geist, Michael, 4,686,249, Cl. 523-410.000.

Bauer Kaba AG: *See*—
Seckinger, Erich; and Gutmann, Walter, 4,686,358, Cl. 235-382.000.

Bauer, Karl-Heinz; and Fick, Heinz, to Preh Elektrofeinmechanische Werke Jakob Preh Nacht. GmbH & Co. Push-pull cable mounting assembly. 4,685,350, Cl. 74-500.00R.

Bauer, Wolfgang; Langer, Manfred; and Sperling, Winfried, to Cassella Aktiengesellschaft. Process for the preparation of diaryl sulphides. 4,686,303, Cl. 560-18.000.

Baum, Walter: *See*—
Schneider, Arthur; Baum, Walter; and Zehl, Hermann, 4,686,530, Cl. 340-870.310.

Baumeister, Ferdnand: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Baur, Roland: *See*—
Biondetti, Mario; and Baur, Roland, 4,686,005, Cl. 162-60.000.

Bausch & Lomb Incorporated: *See*—
Dobner, Michael H.; and Edwards, Evan A., 4,685,648, Cl. 248-572.000.

Baviere, Marc; and Durif Varambon, Bruno, to Institut Francais du Petrole. Micellar systems containing N-acyl N-alkyl α-amino-carboxylic compounds, particularly useful in enhanced hydrocarbon recovery. 4,686,053, Cl. 252-8.554.

Baxter, Andrew J. G.; Dixon, John; Gould, Kenneth J.; and Tinker, Alan C., to Fisons plc. Calcium antagonist 2-fluoroalkyl-1,4-dihydropyridines. 4,686,217, Cl. 514-210.000.

Baxter Travenol Laboratories, Inc.: *See*—
Johnston, William D.; Czuba, Leonard; and Webster, R. D., 4,686,125, Cl. 428-35.000.

Bayer Aktiengesellschaft: *See*—
Angerbauer, Rolf; Boberg, Michael; Metzger, Karl G.; and Zeiler, Hans-Joachim, 4,686,216, Cl. 514-202.000.
Beck, Manfred; and Nentwig, Wolfgang, 4,686,263, Cl. 525-245.000.
Binsack, Rudolf; Kohler, Karl-Heinz; Grigo, Ulrich; Morbitzer, Leo; Bottenbruch, Ludwig; and Heitz, Walter, 4,686,262, Cl. 525-177.000.
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,956, Cl. 71-92.000.
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,957, Cl. 71-92.000.
Kiemle, Peter; Wiese, Jurgen; and Buxbaum, Gunter, 4,686,142, Cl. 428-403.000.
Lantzsch, Reinhard; and Elbe, Hans-Ludwig, 4,686,291, Cl. 544-335.000.
Lockhoff, Oswald; Kruger, Bernd-Wieland; Stadler, Peter; Paessens, Arnold; Streissle, Gert; Taylor, Peter; Zeiler, Hans-Joachim; and Metzger, Karl-Georg, 4,686,208, Cl. 514-42.000.
Maurer, Fritz, 4,686,290, Cl. 544-243.000.
Rosentreter, Ulrich; Perzborn, Elisabeth; and Seuter, Friedel, 4,686,229, Cl. 514-332.000.
Schade, Gerold; Paulus, Wilfried; and Schmitt, Hans-Georg, 4,686,236, Cl. 514-526.000.
Wolff, Joachim; Wolf, Karlheinz; and Marschner, Werner, 4,685,933, Cl. 8-527.000.

BBC Brown, Boveri & Company, Limited: *See*—
Mosele, Joseph, 4,686,603, Cl. 361-118.000.

Beach, David L.; and Kissin, Yury V., to Chevron Research Company. Oligomerization of ethylene using nickel ylide/alkyl aluminum alkoxide catalyst. 4,686,315, Cl. 585-513.000.

Beamer, Ralph R. Portable miter device for chain and hand saws. 4,685,369, Cl. 83-766.000.

Beaudoin, Laurent, to Iona Appliances Inc. Guide for a driven endless belt. 4,685,171, Cl. 15-391.000.

Beaven, Paul A.; Canton, Dave A.; Sargeant, Nick B.; and Snagge, Tom H., to International Business Machines Corporation. Display apparatus with mixed alphanumeric and graphic image. 4,686,521, Cl. 340-703.000.

Bechtel, Pierre: *See*—
Blum, Dominique; Grandmottet, Pierre; and Bechtel, Pierre, 4,686,624, Cl. 364-415.000.

Beck, Earl W.; and Brady, Sam A., to Dow Corning Corporation. Hydraulic silicone crumb. 4,686,271, Cl. 528-15.000.

Beck, Manfred; and Nentwig, Wolfgang, to Bayer Aktiengesellschaft. Modified EPDM rubbers, the production thereof and the use thereof for the production of impact-resistant vinyl polymers. 4,686,263, Cl. 525-245.000.

Becker, Jack W., to United States of America, Air Force. Brush and commutator segment torquer motor. 4,686,397, Cl. 310-36.000.

Becker, Lawrence F., Jr.: *See*—
Murray, Alexander P.; Becker, Lawrence F., Jr.; Slater, Clifton G.; and Skriba, Michael C., 4,685,971, Cl. 134-2.000.

Beckett, Donald E. Production of demetallized packaging material. 4,685,997, Cl. 156-629.000.

Beckwith, Elaine C.; and Williams, Robert M., to Ford Motor Company. Method of making ultrapure silicon nitride precursor. 4,686,095, Cl. 423-324.000.

Becton, Dickinson and Company: *See*—
Edwards, Floyd V.; and Shah, Hasmukh, 4,685,902, Cl. 604-153.000.

Beder, Samuel L. Holdfast cutting system. 4,685,366, Cl. 83-455.000.

Beehive Machinery, Inc.: *See*—
Berrett, Douglas R., 4,685,628, Cl. 241-236.000.

Beenen, Gerhard J.: *See*—
Boso, Brian; Beenen, Gerhard J.; and Murdock, Bruce, 4,685,185, Cl. 29-157.00C.

Beer, Douglas C.: *See*—
Mierau, Cameron D.; Cramond, Patrick J.; and Beer, Douglas C., 4,685,497, Cl. 144-176.000.

Begas, Henk W. A., to U.S. Philips Corporation. Level indicator. 4,686,459, Cl. 324-132.000.

Behnke, Joachim; and Pitowski, Hans-Jurgen, to AKZO NV. Polycarbonate-polyether-copolymer membrane. 4,686,044, Cl. 210-500.220.

Behr, Joseph L., to Emerson Electric Co. Pulse controlled expansion valve for multiple evaporators and method of controlling same. 4,685,309, Cl. 62-212.000.

Behringwerke Aktiengesellschaft: *See*—
Kolar, Cenek, 4,686,193, Cl. 436-536.000.

Beiersdorf Aktiengesellschaft: *See*—
Cohnen, Erich; and Armah, Ben, 4,686,223, Cl. 514-272.000.

Beintze, Guenther: *See*—
Huebner, Horst; Tauber, Guenter; Hofbauer, Peter; Glatzer, Roland; Beintze, Guenther; Wagner, Dieter; and Riege, Guenter, 4,685,328, Cl. 73-55.000.

Bekooij, Jurrianus; Kooijmans, Petrus G.; Raudenbusch, Werner T.; and Stachowiak, Stephen A., to Shell Oil Company. Preparation of binders for coatings, thermosetting coating compositions and their use. 4,686,248, Cl. 523-404.000.

Belanger, Inc.: *See*—
Belanger, James A., 4,685,166, Cl. 15-97.00B.

Belanger, James A., to Belanger, Inc. Apparatus for washing vehicles including plastic bearings. 4,685,166, Cl. 15-97.00B.

Belart, Juan; Burgdorf, Jochen; Weise, Lutz; and Seibert, Wolfram, to Alfred Teves GmbH. Brake system with slip control. 4,685,747, Cl. 303-114.000.

Bell, Weldon K.; Haag, Werner O.; Kirker, Garry W.; and Klocke, Donald J., to Mobil Oil Corporation. Low nitrogen iron-containing

Fischer-Tropsch catalyst and conversion of synthesis gas therewith. 4,686,313, Cl. 585-327.000.

Beloit Corporation: *See*—
Justus, Edgar J., 4,685,183, Cl. 29-116.0AD.

Belorussky Politekhnichesky Institut: *See*—
Lyakhevich, Genrikh D.; Khimanych, Anatoly P.; Suzansky, Vasily G.; and Kovalerchik, Vulf P., 4,686,007, Cl. 201-3.000.

Ben-Gal, Ofer; and Sabatov, Nissim. Labyrinth puzzle. 4,685,679, Cl. 273-153.00R.

Bender, Paul E.; Griswold, Don E.; Hanna, Nabil; and Sarau, Henry M., to SmithKline Beckman Corporation. Inhibition of 5-lipoxygenase products. 4,686,231, Cl. 514-333.000.

Bendiberica S.A.: *See*—
Bacardit, Juan S., 4,685,298, Cl. 60-547.100.
Bacardit, Juan S.; and Folch, Carlos M., 4,685,301, Cl. 60-562.000.

Benguerel, Francois; and Mislin, Roland, to Sandoz Ltd. Mono- and di-sulfo group containing compound having a substituted pyrazolyl diazo component radical and their use. 4,685,934, Cl. 8-684.000.

Benjamin, James A.: *See*—
Schachameyer, Steven R.; Benjamin, James A.; Pardee, John B.; and Hoppie, Lyle O., 4,685,976, Cl. 437-173.000.

Benmiloud, Abdelkader: *See*—
Guignard, Claude; Giglio, Tony; and Benmiloud, Abdelkader, 4,685.453, Cl. 128-90.000.

Benton, Terry L., to Pneumo Corporation. Composite pressure vessel including a fluid port directly through the composite side wall structure. 4,685,589, Cl. 220-465.000.

Benton, Terry L.: *See*—
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,685,384, Cl. 92-166.000.

Beny, Janos; and Yamasaki, Toshio, to Mattel, Inc. Toy vehicle with ejectable flywheel seat and opening gates. 4,685,894, Cl. 446-435.000.

Berendsen, Jules R.: *See*—
De Keyzer, Rene M.; Vaes, Jos A.; and Berendsen, Jules R., 4,686,174, Cl. 430-502.000.

Berg, Ronald W.; and Stewart, Robert L., to Procter & Gamble Company, The. Disposable absorbent articles. 4,685,909, Cl. 604-360.000.

Bergquist Company, The: *See*—
Fick, Herbert J., 4,685,987, Cl. 156-247.000.

Berkley and Company, Inc.: *See*—
Foote, Danny R.; and Turner, Wayne O., 4,685,241, Cl. 43-18.500.

Berland, Pierre-Axel; and Rufray, Jean-Claude, to Deutsche Thomson-Brandt GmbH. Vertical deflection circuit for electron beams in picture tubes. 4,686,432, Cl. 315-403.000.

Berrett, Douglas R., to Beehive Machinery, Inc. Feed mechanism for a deboning machine or the like. 4,685,628, Cl. 241-236.000.

Berry, Peter F.; Miller, Wendell D.; and Nethery, John L., Jr., to Ramsey Engineering Company. Probe for an apparatus for analyzing metals by X-ray fluorescence. 4,686,694, Cl. 378-120.000.

Berticevich, Edward N.: *See*—
Shearon, Charles W.; Berticevich, Edward N.; and Billett, Ronald J., 4,685,214, Cl. 30-391.000.

Betsuki, Katsutoshi: *See*—
Niwa, Shigeo; Kondo, Kazuo; and Betsuki, Katsutoshi, 4,685,919, Cl. 623-21.000.

Betsuki, Kenji: *See*—
Aoyagi, Koshiro; Nishino, Taneharu; and Betsuki, Kenji, 4,685,319, Cl. 72-234.000.

Bettcher Industries, Inc.: *See*—
Scheflow, Oliver W.; Roblin, William J., III; Kirsch, Richard C.; and Wunder, William G., 4,685,364, Cl. 83-68.000.

Betterton, Joseph T.; and Glover, Alfred H., to Chrysler Motors Corporation. Liquid level sensing device. 4,685,332, Cl. 73-309.000.

Betz, Norman L.; and Degoey, Larry W., to Ralston Purina Company. Intake limiting feed for animals containing sucrose octasecetate. 4,686,205, Cl. 514-25.000.

Beyer, Rudolf; Heerdt, Lutz-Peter; and Schemel, Roland, to Schaudt Maschinenbau GmbH. Apparatus for indexing turrets for tools in grinding machines and the like. 4,685,251, Cl. 51-166.00T.

Beyerbach, Daniel M.; Scott, William L.; and Goczalk, Robert W., to Hughes Aircraft Company. Pulse alignment system. 4,686,458, Cl. 324-83.00D.

Bezon, Jacques. Automatic apparatus for the continuous cooking of individual food portions by boiling or frying. 4,685,386, Cl. 99-404.000.

BICC Public Limited Company: *See*—
Daly, Michael J.; and Parr, David T., 4,685,765, Cl. 350-96.210.

Bieber, Gerold: *See*—
Holtermann, Otto; Torbusch, Klaus; and Bieber, Gerold, 4,685,548, Cl. 192-0.080.

Biederman, David L.: *See*—
Roberts, Auston K.; Trainer, William E.; Nakamura, Steve; Duffin, Leon C.; and Biederman, David L., 4,686,094, Cl. 423-322.000.

Bieffe S.p.A.: *See*—
Baldini, Luciano; and Siccardi, Alberto, 4,685,917, Cl. 604-411.000.

Billett, Ronald J.: *See*—
Shearon, Charles W.; Berticevich, Edward N.; and Billett, Ronald J., 4,685,214, Cl. 30-391.000.

Binasik, Chester S.; and Londerville, Steve B., to Coen Company, Inc. Pulverized fuel slurry burner and method of operating same. 4,685,882, Cl. 431-182.000.

Binsack, Rudolf; Kohler, Karl-Heinz; Grigo, Ulrich; Morbitzer, Leo; Bottenbruch, Ludwig; and Heitz, Walter, to Bayer Aktiengesellschaft. Thermoplastic block copolyesters, a process for the preparation thereof and their use for the production of mouldings. 4,686,262, Cl. 525-177.000.

Biondetti, Mario; and Baur, Roland, to Escher Wyss GmbH. Method of washing stock suspensions by removing undesired material through an endless revolving wire. 4,686,005, Cl. 162-60.000.

BioResearch Ithaca Inc.: *See*—
Kurtz, Robert J., 4,685,908, Cl. 604-321.000.

BioSpecific Technologies, Inc.: *See*—
Honard, Mark R.; Holmes, Mark A.; and Jarrett, Robert D., 4,685,900, Cl. 604-5.000.

Birch, David J. S.; and Imhof, Robert E., to University of Strathclyde. Apparatus for measuring fluorescence decay characteristics of materials. 4,686,371, Cl. 250-461.100.

Birse, Alan D.; and King, Alan G., to Imperial Chemical Industries PLC. Method and apparatus for safer remotely controlled firing of ignition elements. 4,685,396, Cl. 102-206.000.

Biter, William J.; and Ceasar, Gerald P., to Standard Oil Company, The. Multiple cell, two terminal photovoltaic device employing conductively adhered cells. 4,686,323, Cl. 136-249.000.

Bitterly, Jack G. Structural member. 4,685,253, Cl. 52-2.000.

Bjornberg, Thomas, to Infrarodteknik AB. Infra-red radiation device. 4,685,762, Cl. 350-1.100.

Blach, Thomas. Ionizing chamber for gaseous oxygen. 4,686,370, Cl. 250-423.00R.

Black, Todd W. Steering wheel cover. 4,685,499, Cl. 150-52.00M.

Blaha, Franklin C.: *See*—
Cricchi, James R.; and Blaha, Franklin C., 4,685,194, Cl. 437-41.000.

Blaisdell, Arthur A.: *See*—
Carr, Kenneth; and Blaisdell, Arthur A., 4,686,498, Cl. 333-260.000.

Blazey, Steven D.: *See*—
Hoyt, John M.; and Blazey, Steven D., 4,686,264, Cl. 525-330.400.

Bliznik, Kenneth E.; and Verboom, Gilles M. L., to Miles Laboratories, Inc. Caustic based cleaning composition containing THFA and a propoxylated alcohol or phenol. 4,686,065, Cl. 252-159.000.

Bloch, Ricardo: *See*—
Wisotsky, Max J.; Bloch, Ricardo; Brownawell, Darrell W.; Chen, Frank J.; and Gutierrez, Antonio, 4,686,054, Cl. 252-32.70E.

Block, Werner; Pabst, Wolfgang; and Pilsak, Manfred, to Patent Treuhand Gesellschaft fur elektrische Gluhlampen mbH. Compact high-pressure discharge lamp with a fill including cadmium and lithium halide. 4,686,419, Cl. 313-641.000.

Blount, Curtis G.: *See*—
Smith, Lonnie J.; Blount, Curtis G.; and Petermann, Steven G., 4,685,516, Cl. 166-65.100.

Blum, Dominique; Grandmottet, Pierre; and Bechtel, Pierre, to Blum, Dominique. Portable apparatus for acquiring and processing data relative to the dietetics and/or the health of a person. 4,686,624, Cl. 364-415.000.

Blyth Holographics Limited: *See*—
Blyth, Jeffrey, 4,685,768, Cl. 350-320.000.

Blyth, Jeffrey, to Blyth Holographics Limited. Color control in holograms. 4,685,768, Cl. 350-320.000.

Boberg, Michael: *See*—
Angerbauer, Rolf; Boberg, Michael; Metzger, Karl G.; and Zeiler, Hans-Joachim, 4,686,216, Cl. 514-202.000.

BOC Group plc, The: *See*—
Makin, Ronald P., 4,686,354, Cl. 219-301.000.

Boca Raton Hotel and Club: *See*—
Balazs, Michael A., 4,685,483, Cl. 135-102.000.

Bockman, Richard S.; and Warrell, Raymond P., Jr., to Sloan-Kettering Institute for Cancer Research. Methods of treating bone disorders. 4,686,104, Cl. 424-131.000.

Bode, Dirk; and Sie, Swan T., to Shell Oil Company. Process for the preparation of hydrocarbons. 4,686,238, Cl. 518-700.000.

Boden, Robert O. Racquet structure. 4,685,676, Cl. 273-73.00D.

Bodensteiner, Donald A.; and Wenthold, David. Vacuum jet apparatus. 4,685,868, Cl. 417-405.000.

Bodewig, Peter, to M. K. Products, Inc. MIG/MAG welding machine for pulsed arc welding. 4,686,350, Cl. 219-130.510.

Boehringer Ingelheim KG: *See*—
Walther, Gerhard; Schneider, Claus; Weber, Karl-Heinz; and Fugner, Armin, 4,686,219, Cl. 514-220.000.

Boeing Company, The: *See*—
Henderson, Michael L.; and Owen, Ralph B., 4,685,643, Cl. 244-199.000.
King, Michael M.; and Walter, Heien J., 4,685,210, Cl. 29-830.000.
Lopez, Nephi E., 4,685,823, Cl. 403-359.000.
Rempt, Raymond D., 4,686,022, Cl. 204-157.410.
Zoerb, Melvin C., 4,685,748, Cl. 303-115.000.

Bogorsky, Mikhail V.: *See*—
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Gorishnyakov, Alexei I.; Bogorsky, Mikhail V.; and Lazebny, Ivan L., 4,686,346, Cl. 219-110.000.

Bohm, Roland: *See*—
Hofinger, Manfred; Hille, Martin; and Bohm, Roland, 4,686,066, Cl. 252-344.000.

Boissevain, Mathew G., to Measurex Corporation. Hot air calender roll controller. 4,685,389, Cl. 100-93.0RP.

Bokil, Delip R., to Analog Devices, Incorporated. Low internal temperature technique for hermetic sealing of microelectronic enclosures. 4,685,200, Cl. 437-215.000.

Boldt, Allyn L.: *See*—
Ryan, Jack L.; Bray, Lane A.; and Boldt, Allyn L., 4,686,019, Cl. 204-1.500.

Boliden Aktiebolag: *See*—
Dahlgren, Sven-Eric; Ekman, Douglas S.; and Ericsson, Claes E., 4,686,105, Cl. 426-74.000.

Boltralik, John J., to Alcon Laboratories, Inc. Anti-inflammatory compounds for ophthalmic use. 4,686,214, Cl. 514-179.000.

Bond, Charles R., to Verbatim Corporation. Magnetic disk for measuring the azimuth of a transducer head. 4,686,470, Cl. 324-207.000.

Bond, Robert H.; and Kraus, Richard B., to General Kinematics Corporation. Foundry sand feeding apparatus. 4,685,504, Cl. 164-203.000.

Bond, Robert H.: *See*—
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.

Bonfils, Georges L. A., to S.F.E.N.A., S.A. Device for mounting a relative displacement sensor on a beam having radial lugs. 4,685,338, Cl. 73-862.620.

Bonilla, Jorge A.; and Elliott, John D., to Foster Wheeler USA Corporation. Asphalt coking method. 4,686,027, Cl. 208-39.000.

Bonnet, Ludwig. Uretero-renoscope. 4,685,449, Cl. 128-4.000.

Book Covers Inc.: *See*—
Carter, Leewood C.; and Neary, Robin P., 4,685,610, Cl. 229-23.00R.

Booth, Dwight E.; and Cory, Michael L., to Dana Corporation. Method of forming a coupling disc for an electromagnetic coupling. 4,685,202, Cl. 29-607.000.

Borg-Warner Corporation: *See*—
Patun, Ronald J.; and Tijunelis, Donatas, 4,685,867, Cl. 417-367.000.

Boschung, Marcel: *See*—
Gisler, Hans; and Boschung, Marcel, 4,685,228, Cl. 37-197.000.

Boso, Brian; Beenen, Gerhard J.; and Murdock, Bruce, to Tektronix, Inc. Method of manufacturing an ink jet head. 4,685,185, Cl. 29-157.00C.

Boteler, William C.; and Ehrenfels, Alfred L., to Hubbell Incorporated. Overhead wiring system. 4,686,381, Cl. 307-147.000.

Bottenbruch, Ludwig: *See*—
Binsack, Rudolf; Kohler, Karl-Heinz; Grigo, Ulrich; Morbitzer, Leo; Bottenbruch, Ludwig; and Heitz, Walter, 4,686,262, Cl. 525-177.000.

Boulitrop, Francois: *See*—
Szydlo, Nicolas; and Boulitrop, Francois, 4,685,195, Cl. 437-41.000.

Bourdon, Guy; and Lampin, Dominique, to L'Air Liquide. Flowmeter having a thermoresistant element and its calibration process. 4,685,324, Cl. 73-3.000.

Boutni, Omar M., to General Electric Company. Thermoplastically moldable compositions. 4,686,256, Cl. 524-318.000.

Bowden, Edgar A.: *See*—
Givens, Wyatt W.; and Bowden, Edgar A., 4,686,477, Cl. 324-366.000.

Bowen, Henry D.: *See*—
Law, S. Edward; and Bowen, Henry D., 4,685,620, Cl. 239-3.000.

Boyd, John H., Jr., to General Electric Company. Method of assembling a stationary assembly for a dynamoelectric machine. 4,685,201, Cl. 29-596.000.

Brabazon, James A. Adjustable water temperature safety control unit. 4,685,156, Cl. 4-194.000.

Brackett, Douglas C. Device for converting linear motion to rotary motion or vice versa. 4,685,342, Cl. 74-50.000.

Brackett, George E., to Maxaxam Corporation. Power transmission system. 4,685,346, Cl. 74-427.000.

Brady, Sam A.: *See*—
Beck, Earl W.; and Brady, Sam A., 4,686,271, Cl. 528-15.000.

Bragg, Charles D.: *See*—
Kermode, Nigel J.; and Bragg, Charles D., 4,686,062, Cl. 252-99.000.

Brambilla, Dario, to Dario Manuli S.p.A. Process for continuous wrapping an object and machine for carrying out the process. 4,685,270, Cl. 53-176.000.

Branc, Joseph R., Merchant, Thomas J.; Miller, William L.; and Piszczak, Philip J., to Allen-Bradley Company, Inc. Disc drive isolation system. 4,685,303, Cl. 62-3.000.

Brand, Edward M.: *See*—
Medvick, Richard J.; Weber, Richard C., Jr.; Wagner, Ross L.; and Brand, Edward M., 4,685,490, Cl. 137-614.030.

Brand, Erich: *See*—
Lochner, Kaspar; Schurmann, Helmut; and Brand, Erich, 4,686,057, Cl. 252-62.000.

Brandoli, Luigi, to ELCAT Direzione Sviluppo S.p.A. Envelope for housing and fixing an adjustment rod adjusting the position of a motorcar seat. 4,685,734, Cl. 297-355.000.

Brasz, Albert J. H.: *See*—
Nagtzaam, Nicolaas P.; Bronke, Cornelis; and Brasz, Albert J. H., 4,686,279, Cl. 528-501.000.

Braun Aktiengesellschaft: *See*—
Moravek, Peter; Trebitz, Bernd; Weller, Albrecht; and Amsel, Klaus, 4,685,229, Cl. 38-84.000.

Braun, Ernst P. Appliance for removal of burrs on flame-cut slabs; blooms and billets. 4,685,192, Cl. 29-526.400.

Bravo, Hernan G.: *See*—
Malik, Vedpal S.; Semp, Bernard A.; Bravo, Hernan G.; and Teng, Daniel M., 4,685,478, Cl. 131-297.000.

Bray, Lane A.: *See*—
Ryan, Jack L.; Bray, Lane A.; and Boldt, Allyn L., 4,686,019, Cl. 204-1.500.

Bresson, Clarence R.; Parlman, Robert M.; and Kimble, James B., to Phillips Petroleum Company. Trithiocarbonates as flotation reagents. 4,686,033, Cl. 209-167.000.

Breville R & D Pty. Ltd.: *See*—
McClean, John W., 4,685,479, Cl. 132-36.00R.

Brewer, Frank. Outboard motor support. 4,685,888, Cl. 440-53.000.

Brigham, William D.; and Nguyen, Dinh, to Zwick Energy Research Organization, Inc. Exhaust cooling system for internal combustion engine. 4,685,292, Cl. 60-320.000.

Briglia, Joseph F.: *See*—
Hackstie, Louis F.; Briglia, Joseph F.; and Cohen, Albert, 4,686,403, Cl. 310-90.000.

Brininstool, Michael R., to United States of America, Navy. Integrated optical time domain reflectometer/insertion loss measurement system. 4,685,799, Cl. 356-73.100.

Bristol, L. Rodney, to Tektronix, Inc. Cursor display for oscilloscopes. 4,686,523, Cl. 340-709.000.

British-American Tobacco Company Limited: *See*—
Ridler, Keith D.; Taylor, Peter J.; Poley, John; Norvall, Christopher W.; and Upton, John, 4,685,475, Cl. 131-84.100.

British Hydromechanics Research Association, The: *See*—
Pollard, Geoffrey J.; and Baker, Roger C., 4,685,811, Cl. 366-275.000.

British Telecommunications Public Limited Company: *See*—
Croft, David C., 4,686,383, Cl. 307-200.00B.
Greaves, Alan J.; and Hunter, Phillip J., 4,686,486, Cl. 330-107.000.

Brock, Timothy A., to Phillips Petroleum Company. Expansible and contractible duct. 4,685,703, Cl. 285-47.000.

Broecker, Franz J., to BASF Aktiengesellschaft. Preparation of catalysts for the detoxification of waste gases. 4,686,202, Cl. 502-300.000.

Bronke, Cornelis: *See*—
Nagtzaam, Nicolaas P.; Bronke, Cornelis; and Brasz, Albert J. H., 4,686,279, Cl. 528-501.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Yamamoto, Takemi; and Miki, Yasuhiro, 4,685,814, Cl. 400-82.000.

Brown, Arthur K., Jr., to Allied Corporation. Hydraulic brake booster with quick take-up and full stroke. 4,685,297, Cl. 60-547.100.

Brown, Cal R.: *See*—
Corbin, Susan E.; Brown, Cal R.; Crozier, David W.; and Williams, Peter C., 4,685,488, Cl. 137-328.000.

Brown, Donnamae J. Photographic disc viewer. 4,685,231, Cl. 40-366.000.

Brown, Edward M.: *See*—
Towns, Edward J.; and Brown, Edward M., 4,685,580, Cl. 215-260.000.

Brown, Melvin H., to Aluminum Company of America. Planar heat exchange insert and method. 4,685,514, Cl. 165-177.000.

Brown & Williamson Tobacco Corporation: *See*—
Flaherty, Kenneth A.; Huber, Daniel J.; and Lewis, Robert T., 4,685,993, Cl. 156-475.000.

Brownawell, Darrell W.: *See*—
Wisotsky, Max J.; Bloch, Ricardo; Brownawell, Darrell W.; Chen, Frank J.; and Gutierrez, Antonio, 4,686,054, Cl. 252-32.70E.

Bruekers, Alphons A. M. L.: *See*—
Kessels, Jozef L. W.; and Bruekers, Alphons A. M. L., 4,686,670, Cl. 370-68.000.

Brun, Norbert: *See*—
Cibie, Pierre; and Brun, Norbert, 4,686,610, Cl. 362-61.000.

Brunken, Gerd; Gob, Werner; and Reis, Oswald, to Fichtel & Sachs AG. Temperature-dependently controllable fluid friction clutch. 4,685,549, Cl. 192-58.00B.

Bruno, Carlo M.; Panarotto, Gianfranco; and Tofanelli, Adler, to Cselt-Centro Stude e Laboratori Telecomunicazione S.p.A. System for bidirectional digital transmission with echo cancellation. 4,686,703, Cl. 379-410.000.

Brunswick Corporation: *See*—
Burns, Richard L.; and Petcavich, Robert J., 4,686,127, Cl. 428-40.000.
Burns, Richard L.; and Petcavich, Robert J., 4,686,141, Cl. 428-344.000.

Bryan, Bobby H.: *See*—
Golay, Kenneth W.; and Bryan, Bobby H., 4,685,846, Cl. 410-49.000.

Bryan, John N., to Dresser Industries, Inc. Method and apparatus for generating a display of well logging measurements. 4,686,625, Cl. 364-422.000.

Bryant, Collin J.; and Mitsopoulos, Tom, to Valvoline Oil & Chemicals Ltd. Saturated linear polyester resin composition suitable for coating a metal for anti-corrosion and/or decorative purposes. 4,686,275, Cl. 528-295.500.

Bryer, Philip, to Xebec Development Partners, Ltd. Apparatus for repositioning a transducer in the absence of electrical current to a drive system. 4,686,595, Cl. 360-106.000.

Bryk, Stephen A.: *See*—
Kidaloski, Raymond G.; Olinger, Harry S.; and Bryk, Stephen A., 4,685,426, Cl. 122-214.000.

Buchanan, Harry C., Jr.: *See*—
Fannin, Wayne V.; and Buchanan, Harry C., Jr., 4,685,545, Cl. 188-299.000.

Bucher, Hans R., to Xedar Corporation. Automatic initiation of target crossover recovery in a pyroelectric camera. 4,686,566, Cl. 358-113.000.

Buckenauer, Gunter, to Friedrick Maurer Sohne GmbH & Co. KG. Device for use in expansion joints. 4,685,825, Cl. 404-65.000.

Bucksch, Walter, to Texas Instruments Incorporated. Protective circuit arrangement for protecting semiconductor components. 4,686,602, Cl. 361-91.000.

Buhren, Heinz; and Schumacher, Winfried, to W. Schlafhorst & Co. Method and device for supplying an automatic winding machine with bobbins. 4,685,630, Cl. 242-35.5QA.

Bulle, Marshall R. Hand cart. 4,685,854, Cl. 414-452.000.

Bunn-O-Matic Corporation: *See*—
Nidiffer, Charles A.; and Van Camp, Raymond E., 4,685,624, Cl. 241-36.000.

Bunning, Ernst; and Hutchins, Wayne, to Maremont Corporation. Barrel alignment device in automatic weapon. 4,685,235, Cl. 42-75.020.

Burcham, Larry R.: *See*—
Cartmell, James V.; Allaire, Michael J.; Burcham, Larry R.; and Patrick, Charles T., Jr., 4,685,467, Cl. 128-640.000.

Burdick, William S., to Sundstrand Data Control, Inc. Timing circuit for varying the horizontal format of raster scanned display. 4,686,567, Cl. 358-150.000.

Burg, Stanley P. Hypobaric storage of respiring plant matter without supplementary humidification. 4,685,305, Cl. 62-78.000.

Burgdorf, Jochen: *See*—
Belart, Juan; Burgdorf, Jochen; Weise, Lutz; and Seibert, Wolfram, 4,685,747, Cl. 303-114.000.

Burge, Theodor A.; and Schweizer, Reinhard, to Sika AG, vorm. Kaspar Winkler & Co. Process for preparing a building and/or construction material, a polymer modified aqueous dispersion, and use thereof for the preparation of a building and/or construction material. 4,686,252, Cl. 524-3.000.

Burger, Jacques; Gadelle, Claude; and Salle de Chou, Jacques, to Institut Francais du Petrole. Method of consolidating a geological formation by thermal polymerization. 4,685,836, Cl. 405-264.000.

Burgess, Ken L., to Hewlett-Packard Company. Digitizing method and apparatus for compensating cursor of stylus velocity errors. 4,686,331, Cl. 178-19.000.

Burgess, Trevor M., to Schlumberger Technology Corporation. Assessment of drilling conditions. 4,685,329, Cl. 73-151.000.

Burian, Theodor; and Siegel, Herbert, to Standard Elektrik Lorenz AG. Cellular communication system operable with transmission pathfault. 4,686,671, Cl. 370-88.000.

Burke, Robert V., to MagneTek, Inc. Fluorescent lamp dimming switch. 4,686,427, Cl. 315-219.000.

Burney, Ivan T.: *See*—
Crookston, Ronald W.; and Burney, Ivan T., 4,686,337, Cl. 200-148.00F.

Burnham, William L., to Eastman Kodak Company. Film registration apparatus. 4,685,788, Cl. 354-121.000.

Burns, Joseph R. Ocean wave energy conversion using piezoelectric material members. 4,685,296, Cl. 60-497.000.

Burns, Michael E., to Procter & Gamble Company, The. Fatty peroxyacids or salts thereof having amide moieties in the fatty chain and low levels of exotherm control agents. 4,686,063, Cl. 252-102.000.

Burns, Richard L.; and Petcavich, Robert J., to Brunswick Corporation. Pellicular laminate means for shielding structures from electromagnetic radiation. 4,686,127, Cl. 428-40.000.

Burns, Richard L.; and Petcavich, Robert J., to Brunswick Corporation. Pellicular laminate means for shielding structures from electromagnetic radiation. 4,686,141, Cl. 428-344.000.

Burnside, Martin B., to Aircraft Materials Limited. Safety fastener. 4,685,176, Cl. 24-631.000.

Burr-Brown Corporation: *See*—
Koen, Myron J., 4,686,511, Cl. 340-347.0AD.

Burroughs Corporation: *See*—
Deal, Gregory K.; and Manco, Richard J., 4,686,691, Cl. 377-54.000.

Burstein, A. Lincoln; and Burstein, Roy. Method and apparatus for control of fluids. 4,685,534, Cl. 181-251.000.

Burstein, Roy: *See*—
Burstein, A. Lincoln; and Burstein, Roy, 4,685,534, Cl. 181-251.000.

Bush, Harold G.; Mikulas, Martin M., Jr.; Wallsom, Richard E.; and Jensen, J. Kermit, to United States of America, National Aeronautics and Space Administration. Mobile remote manipulator vehicle system. 4,685,535, Cl. 182-63.000.

Bush, J. Finley; and Mydock, Donald R., to Aluminum Company of America. Method for regenerating adsorbent mixture of alumina and zeolite for adsorption of ammonia. 4,686,198, Cl. 502-25.000.

Bushman, Kimbley A.: *See*—
Turner, Robert B.; Peffley, Richard D.; Plepys, Raymond A.; Priester, Ralph D.; Gonzales, Manuel, Jr.; and Bushman, Kimbley A., 4,686,242, Cl. 521-137.000.

Buss AG: *See*—
Chevroulet, Leon; and Salmon, Guy, 4,685,875, Cl. 425-136.000.

Busta, Heinz H.; and Cuellar, Raul D. Method of making micromachined refractory metal field emitters. 4,685,996, Cl. 156-628.000.

Butterworth Systems, Inc.: *See*—
Furness, John A.; and Haggerty, John, 4,685,974, Cl. 134-22.180.

Buxbaum, Gunter: *See*—
Kiemle, Peter; Wiese, Jurgen; and Buxbaum, Gunter, 4,686,142, Cl. 428-403.000.

Buxton, James L.; Phillips, Alan C.; and Honey, Stanley K., to Etak, Inc. Method and apparatus for generating a stroke on a display. 4,686,642, Cl. 364-607.000.

Byk Gulden Lomberg Chemische Fabrik GmbH: *See*—
Rainer, Georg; Figala, Volker; and Kohl, Bernhard, 4,686,230, Cl. 514-338.000.

C.A. Weidmuller GmbH & Co.: *See*—
Hanning, Walter, 4,685,887, Cl. 439-188.000.

Caber Italia S.p.A.: *See*—
Olivieri, Icaro; and Sartor, Leo, 4,685,226, Cl. 36-120.000.

Cable Electric Products, Inc.: *See*—
Schwartz, Frederic W., 4,685,634, Cl. 242-96.000.

Cable, Vaughn P.; Nason, Clyde K.; and Culp, Gordon W., to Pacesetter Infusion, Ltd. External infusion pump apparatus. 4,685,903, Cl. 604-154.000.

Cadee, Theodorus P. M.; Van der Veen, Siebren C.; and Fluks, Marten, to Octrooibureau Zuid. Transmission and steering system for cross-country vehicle. 4,685,353, Cl. 74-689.000.

CAE Machinery Ltd.: *See*—
Mierau, Cameron D.; Cramond, Patrick J.; and Beer, Douglas C., 4,685,497, Cl. 144-176.000.

Cairns, Bruce R.: *See*—
Delfino, Michelangelo; and Cairns, Bruce R., 4,686,113, Cl. 427-45.100.

Caldwell Manufacturing Company: *See*—
Yonovich, John R., 4,685,175, Cl. 16-197.000.

Calgon Corporation: *See*—
Arots, Joseph B., 4,686,047, Cl. 210-712.000.

Calhoun, Myrtle M. Magnifying reading stand. 4,685,647, Cl. 248-444.100.

Callant, Paul R.: *See*—
Vermeulen, Leon L.; Ghys, Theofiel H.; De Smedt, Willy P.; Vervloet, Ludovicus H.; and Callant, Paul R., 4,686,170, Cl. 430-244.000.

Camar S.p.A.: *See*—
Cattaneo, Carlo, 4,685,645, Cl. 248-188.800.

Camp, Jean-Jacques: *See*—
Veysset, Jean-Paul; Camp, Jean-Jacques; and Noel, Didier, 4,686,067, Cl. 252-626.000.

Campbell, Edward R., III; and Lewis, Henry G., Jr., to RCA Corporation. Circuitry for reducing demodulation phase error as for an automatic deghosting system. 4,686,569, Cl. 358-167.000.

Campbell, Roy: *See*—
Price, Anthony G.; and Campbell, Roy, 4,685,541, Cl. 188-71.400.

Campbell, Simon F.; and Hardstone, John D., to Pfizer Inc. Quinoline therapeutic agents. 4,686,228, Cl. 514-307.000.

Campbell, W. Sherwood: *See*—
Masuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, 4,686,564, Cl. 358-86.000.

Canada, Her Majesty the Queen in right of: *See*—
Paquet, Laurent J., 4,685,800, Cl. 356-152.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government: *See*—
MacDonald, Robert I.; Hara, Elmer H.; and Poirier, Arthur L., 4,686,533, Cl. 342-373.000.

Canadas, Jean C., to Compagnie Industrielle de Mecanismes en abrege C.I.M. Sun visor for a motor vehicle. 4,685,723, Cl. 296-97.00H.

Canadian Marconi Company: *See*—
Alcock, David, 4,686,536, Cl. 343-700.0MS.

Caner, Ali R.; and Spencer, Kenneth B., to American Can Company. Method of forming a long shelf-life food package. 4,685,273, Cl. 53-440.000.

Cano, Francis R.: *See*—
Ritchey, Mary B.; Cano, Francis R.; O'Hara, Gerald J.; English, James D.; and Lin, Wenlii, 4,686,102, Cl. 424-92.000.

Canon Kabushiki Kaisha: *See*—
Arai, Ryuichi; and Sakaki, Mamoru, 4,686,118, Cl. 427-261.000.
Arimoto, Shinobu, 4,686,577, Cl. 358-256.000.
Hirose, Ryusho, 4,685,777, Cl. 350-505.000.
Ikeda, Masami; Shibata, Makoto; Takahashi, Hiroto; and Matsuda, Hiroto, 4,686,544, Cl. 346-140.00R.
Isaka, Kazuo, 4,686,661, Cl. 369-13.000.
Kato, Yuzo; and Suzuki, Hidetoshi, 4,686,580, Cl. 358-287.000.
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Kiuchi, Masayoshi; and Amano, Kenichiro, 4,685,789, Cl. 354-173.110.
Kobayashi, Junji; and Nakano, Hisashi, 4,686,591, Cl. 360-85.000.
Kouzato, Yasuo, 4,686,538, Cl. 346-1.100.
Nagata, Satoshi, 4,686,525, Cl. 340-790.000.
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.
Ohmi, Tadahiro; and Tanaka, Nobuyoshi, 4,686,554, Cl. 357-30.000.
Petersdorf, Gerhard, 4,685,664, Cl. 271-227.000.
Sakamoto, Masahiro, 4,686,579, Cl. 358-282.000.
Sawada, Takamasa; and Ihikawa, Junji, 4,685,793, Cl. 355-3.0SH.
Shimizu, Katsuichi; Sakamaki, Hisashi; Furuichi, Katsushi; and Honma, Toshio, 4,685,796, Cl. 355-14.00R.
Takimoto, Hiroyuki, 4,686,589, Cl. 360-77.000.

Canton, Dave A.: *See*—
Beaven, Paul A.; Canton, Dave A.; Sargeant, Nick B.; and Snagge, Tom H., 4,686,521, Cl. 340-703.000.

Capasso, Federico; and Cho, Alfred Y., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Heterojunction semiconductor devices having a doping interface dipole. 4,686,550, Cl. 357-16.000.

Carbon Fuels Corporation: *See*—
Meyer, Edmond G.; and Meyer, Lee G., 4,685,936, Cl. 44-51.000.

Carl Manufacturing Co., Ltd.: *See*—
Mori, Chuzo, 4,685,232, Cl. 40-381.000.

Carlingswitch, Inc.: *See*—
Sapone, Frank P., 4,686,339, Cl. 200-339.000.
Sorenson, Richard W., 4,686,336, Cl. 200-61.620.

Carlisle, Richard S. Hand exercising device. 4,685,665, Cl. 272-67.000.

Carlsen, W. John; and Melman, Paul, to GTE Laboratories Incorporated. Birefringent optical multiplexer with flattened bandpass. 4,685,773, Cl. 350-401.000.

Carlson, Steven J.; Donald, William W.; and Lepine, James J., to United States of America, Agriculture. Washer for plant roots and other articles. 4,685,481, Cl. 134-155.000.

Carmillet, Roger; Graton, Michel; and Bacher, Michel, to Valeo. Clutch disk with torsional damper assembly. 4,685,896, Cl. 464-68.000.

Caron, Bernard G.: *See*—
Hoffer, John C.; Caron, Bernard G.; and Rupert, Martin R., 4,685,764, Cl. 350-96.200.

Carr, Kenneth; and Blaisdell, Arthur A., to M/A-COM, Inc. Coaxial connector. 4,686,498, Cl. 333-260.000.

Carroll, Thomas D.; and Akers, Clifford B. Disk drive assembly. 4,686,592, Cl. 360-97.000.

Carter, Duane E.: *See*—
Davis, Cecil J.; Carter, Duane E.; and Jucha, Rhett B., 4,685,599, Cl. 156-643.000.

Carter, Leewood C.; and Neary, Robin P., to Book Covers Inc. Container and method of making a container with integral bottom panel and side panels. 4,685,610, Cl. 229-23.00R.

Cartmell, James V.; Allaire, Michael J.; Burcham, Larry R.; and Patrick, Charles T., Jr., to American Hospital Supply Corporation. X-ray transparent medical electrodes and lead wires and assemblies thereof. 4,685,467, Cl. 128-640.000.

Carty, Noel C.: *See*—
Lee, Kevin J.; and Carty, Noel C., 4,685,656, Cl. 256-13.100.

Casio Computer Co., Ltd.: *See*—
Okuda, Hiroko; and Iwase, Hiroshi, 4,685,370, Cl. 84-1.030.

Caspell, George J., to Tektronix, Inc. Triggered voltage controlled oscillator using fast recovery gate. 4,686,489, Cl. 331-57.000.

Cassella Aktiengesellschaft: *See*—
Bauer, Wolfgang; Langer, Manfred; and Sperling, Winfried, 4,686,303, Cl. 560-18.000.

Catalano, Lou: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Catotti, Arthur J.: *See*—
Pensabene, Saverio F.; West, Jon K.; Leclair, Robert A.; Van Conant, Carl F.; Catotti, Arthur J.; and Fralick, William L., 4,686,013, Cl. 204-2.100.

Cattaneo, Carlo, to Camar S.p.A. Table leg with sheating. 4,685,645, Cl. 248-188.800.

Ceasar, Gerald P.: *See*—
Biter, William J.; and Ceasar, Gerald P., 4,686,323, Cl. 136-249.000.

Cellarius, Hans J.: *See*—
Hoegerle, Karl; Cellarius, Hans J.; Rathgeb, Paul; and Rumpf, Jurg, 4,686,294, Cl. 548-140.000.

Celli, Giuliano. Universal trailer. 4,685,855, Cl. 414-482.000.

Ceperley, Peter H. Split mode traveling wave ring-resonator. 4,686,407, Cl. 310-323.000.

Chambers, David L.: *See*—
Dixon, Glenn A.; McCloskey, Clark E.; Chambers, David L.; Hawk, Woodrow D.; and McCracken, Oliver W., 4,685,522, Cl. 166-372.000.

Chang, Donald C. D.; and Wong, Mon N., to Hughes Aircraft Company. Wideband short slot hybrid coupler. 4,686,493, Cl. 333-113.000.

Chang, I-Cheng, to United States of America, Air Force. Tunable acousto-optic filter with improved spectral resolution and increased aperture. 4,685,772, Cl. 350-372.000.

Chang, Keh-Minn, to General Electric Company. Fatigue-resistant nickel-base superalloys and method. 4,685,977, Cl. 148-12.70N.

Chang, Michael N.; Jensen, Norman P.; Hammond, Milton L.; Zambias, Robert A.; McDonald, John; and Rupprecht, Kathleen M., to Merck & Co., Inc. Substituted cinnamyl-2,3-dihydrobenzofuran and analogs useful as anti-inflammatory agents. 4,686,235, Cl. 514-520.000.

Chang, Shih-Jeh, to American Telephone and Telegraph Company, AT&T Bell Laboratories. Path hunting in a distributed control switching system. 4,686,669, Cl. 370-54.000.

Chanter, Edward G.: *See*—
Perkitny, Jerzy; and Chanter, Edward G., 4,685,893, Cl. 446-319.000.

Chantiers du Nord et de la Mediterranee: *See*—
Moreau, Jean-Pierre L., 4,685,742, Cl. 299-8.000.

Chaparral Communications: *See*—
Howard, H. Taylor, 4,686,491, Cl. 333-21.00A.

Chaussard, Jacques, to Societe Nationale des Poudres et Explosifs. Organic electrolysis cell with sacrificial electrode. 4,686,018, Cl. 204-59.00R.

Chaussy, Christian: *See*—
Forssmann, Bernd; Hepp, Wolfgang; Ackern, Klaus; and Chaussy, Christian, 4,685,461, Cl. 128-328.000.

Chavdarian, Charles G., to Stauffer Chemical Company. S-(oxoalkyl)-trithiophosphonate insecticides. 4,686,210, Cl. 514-125.000.

Cheetham, Jeffery J.: *See*—
Parker, Graham J., 4,686,082, Cl. 420-503.000.

ChemCat Corporation: *See*—
Elvin, Frank J., 4,686,197, Cl. 502-22.000.

Chen, Chang C., to Industrial Technology Research Institute. Device to remove peanuts from the root thereof. 4,685,388, Cl. 99-641.000.

Chen, Frank J.: *See*—
Wisotsky, Max J.; Bloch, Ricardo; Brownawell, Darrell W.; Chen, Frank J.; and Gutierrez, Antonio, 4,686,054, Cl. 252-32.70E.

Chen, Wen Chung. Nursing bottle. 4,685,577, Cl. 215-11.00D.

Cheng, Dah Y., to International Power Technology. Apparatus for removing noncondensable gases from cogenerated process steam in dual fluid Cheng cycle engines. 4,685,288, Cl. 60-39.550.

Cheo, Peter K.: *See*—
Wagner, Robert A.; and Cheo, Peter K., 4,685,988, Cl. 156-250.000.

Chermensky, Dmitry N.: *See*—
Redikultsev, Jury V.; Litvinenko, Leonid A.; Golovlev, Evgeny L.; Golovleva, Ljudmila A.; Chermensky, Dmitry N.; and Skryabin, Georgy K., 4,686,189, Cl. 435-289.000.

Cheshire, James O.; Marinack, Robert J.; Van den Akker, Johannes A.; and Lindgren, Douglas L., to James River - Norwalk, Inc. Apparatus and method for the manufacture of fibrous webs. 4,686,006, Cl. 162-336.000.

Chesneau, Rene ; and Prevot, Claude, to Thomson-CGR. Device for creating and/or receiving an alternating magnetic field for an apparatus using nuclear magnetic resonance. 4,686,473, Cl. 324-320.000.

Chester, Arthur W.: *See*—
Chu, Yung-Feng; and Chester, Arthur W., 4,686,312, Cl. 585-315.000.

Chevron Research Company: *See*—
Beach, David L.; and Kissin, Yury V., 4,686,315, Cl. 585-513.000.
Smith, David S.; and Kamins, Harold W., 4,685,842, Cl. 406-106.000.

Chevroulet, Leon; and Salmon, Guy, to Buss AG. Pressure relief device for extrusion apparatus. 4,685,875, Cl. 425-136.000.

Chiba, Kei: *See*—
Ide, Tatsumi; Morimoto, Masayuki; and Chiba, Kei, 4,686,500, Cl. 335-128.000.

Chiba, Takanori: *See*—
Honda, Masaru; Chiba, Takanori; Imokawa, Toshiaki; Harada, Yoshito; and Nagayasu, Katsumi, 4,686,145, Cl. 428-425.900.

Childress, Dudley; and Strysik, John, to Northwestern University. Voluntary opening prehension device. 4,685,925, Cl. 623-25.000.

Chisso Corporation: *See*—
Sugimori, Shigeru, 4,686,305, Cl. 560-75.000.

Cho, Alfred Y.: *See*—
Capasso, Federico; and Cho, Alfred Y., 4,686,550, Cl. 357-16.000.

Cho, Frederick Y.; and Hickernell, Fred S., to Motorola, Inc. Passivated and low scatter acoustic wave devices and method thereof. 4,686,111, Cl. 427-38.000.

Choay, Jean: *See*—
Lormeau, Jean-Claude; and Choay, Jean, 4,686,288, Cl. 536-21.000.

Choy, Daniel S. J. Method for using a ventricular assist device. 4,685,446, Cl. 128-1.00D.

Christensen, Joel R.; Liang, Paul H.; and Thompson, Mark E., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,685,955, Cl. 71-92.000.

Christiansen, Preben; Eskildsen, Christian; and Thomsen, Svend E., to Danfoss A/S. Control device for a hydraulically operated consumer. 4,685,295, Cl. 60-459.000.

Chrysler Motors Corporation: *See*—
Betterton, Joseph T.; and Glover, Alfred H., 4,685,332, Cl. 73-309.000.
Hoss, Donald A., 4,685,571, Cl. 206-583.000.
Pavur, Carol P., 4,685,173, Cl. 16-2.000.
Wachowski, Raymond J.; and Mulso, Francis A., 4,685,712, Cl. 293-128.000.

Chu, Yung-Feng; and Chester, Arthur W., to Mobil Oil Corporation. Aromatics production. 4,686,312, Cl. 585-315.000.

Chung, Fred C.: *See*—
Karle, Dennis W.; Payne, Zie A.; Chung, Fred C.; and Clark, Ross P., 4,686,146, Cl. 428-425.900.

Chung, Kah-Seng; and Verstappen, Hendrikus L., to U.S. Philips Corporation. Arrangement for generating an angle-modulated carrier signal of a constant amplitude in response to data signals. 4,686,688, Cl. 375-47.000.

Church, Kristy L. Stress gauging device for threaded connector. 4,685,337, Cl. 73-762.000.

Ciba-Geigy Corporation: *See*—
Hoegerle, Karl; Cellarius, Hans J.; Rathgeb, Paul; and Rumpf, Jurg, 4,686,294, Cl. 548-140.000.
Topfl, Werner; Meyer, Willy; and Schneider, Hans-Dieter, 4,685,961, Cl. 71-92.000.

Cibie, Pierre; and Brun, Norbert, to Cibie Projecteurs. Motor vehicle headlamps projecting a masked beam, in particular a dipped beam. 4,686,610, Cl. 362-61.000.

Cibie Projecteurs: *See*—
Cibie, Pierre; and Brun, Norbert, 4,686,610, Cl. 362-61.000.

Cicanese, William C. Portable safety trench and pit form system. 4,685,837, Cl. 405-282.000.

Cieslak, Leonard. Portable heater for wearing apparel. 4,685,442, Cl. 126-204.000.

Cincinnati Microwave, Inc.: *See*—
Furnish, Gregory R., 4,686,499, Cl. 333-230.000.

Cincinnati Milacron Inc.: *See*—
Loscei, Anthony A., 4,685,876, Cl. 425-170.000.

Cities Service Oil and Gas Corporation: *See*—
Mueller, Richard A.; and Laughry, David L., 4,685,191, Cl. 29-523.000.

Citizen Watch Co., Ltd.: *See*—
Kurafuji, Hiroshi, 4,686,594, Cl. 360-99.000.
Yoshida, Hirohiko; and Natori, Minoru, 4,686,519, Cl. 340-701.000.

Clarion Co., Ltd.: *See*—
Kizaki, Yoshio, 4,686,702, Cl. 379-373.000.

Clark, Daren A.: *See*—
Parker, Delbert R.; and Clark, Daren A., 4,686,502, Cl. 337-252.000.

Clark, James d'A. Method and apparatus for treating pulp. 4,685,623, Cl. 241-21.000.

Clark, Jimmy M.: *See*—
Steenblik, Richard A.; Phillips, Asa R.; Mamay, Daniel P.; Denson, Lawrence K.; Tucker, Richard A.; and Clark, Jimmy M., 4,685,718, Cl. 296-154.000.

Clark, Ross P.: *See*—
Karle, Dennis W.; Payne, Zie A.; Chung, Fred C.; and Clark, Ross P., 4,686,146, Cl. 428-425.900.

Clark, William M., Jr.: *See*—
McKenna, Charles M.; Sharapata, Irwin R.; and Clark, William M., Jr., 4,686,414, Cl. 313-362.100.

Clarke, Donald A.: *See*—
Liptay-Wagner, Nicholas; Renaud, Roland; Pryor, Timothy R.; and Clarke, Donald A., 4,686,374, Cl. 250-571.000.

Claude, Jean P.: *See*—
Schmid, Adalbert; Kiener, Alfons; Kagi, Stephan; and Claude, Jean P., 4,685,969, Cl. 106-35.000.

Claycomb, Jack R., to Rickert Precision Industries, Inc. Blast joint. 4,685,518, Cl. 166-243.000.

Cleary, Edward J., Jr.; and Coleman, Mike R., to Tektronix, Inc. Digital peak-hold circuit. 4,686,390, Cl. 307-351.000.

Clevite Industries Inc.: *See*—
Kowal, Leonard J.; Schwarz, Albert J.; and Wells, Norman B., 4,685,706, Cl. 285-322.000.

Clinical Plastic Products: *See*—
Jeanneret nee Aab, Hedwig, 4,685,905, Cl. 604-247.000.

Clowes, Ernest J., to Aluminum Company of America. Method of forming a drawn and redrawn container body. 4,685,322, Cl. 72-348.000.

Coe, Norman A.: *See*—
Greenwalt, Tibor J.; and Coe, Norman A., 4,685,314, Cl. 70-57.000.

Coen Company, Inc.: *See*—
Binasik, Chester S.; and Londerville, Steve B., 4,685,882, Cl. 431-182.000.

Coggin, Joseph H., Jr.; and Payne, William J., Jr., to South Alabama Medical Science Foundation. Onco-fetal specific monoclonal antibodies, methods of preparation and use. 4,686,180, Cl. 435-7.000.

Cohen, Albert: *See*—
Hackstie, Louis F.; Briglia, Joseph F.; and Cohen, Albert, 4,686,403, Cl. 310-90.000.

Cohen, Joseph; and Lorthioir, Gerard, to Pechiney. Apparatus for the production of a metal by electrolyzing halides in a molten salt bath, by a simultaneous continuous double deposit. 4,686,025, Cl. 204-245.000.

Cohen, Lyle A.: *See*—
Gordon, Arnold Z.; and Cohen, Lyle A., 4,686,109, Cl. 427-36.000.

Cohen, Philip S.; and Schnittger, Robert E., Jr., to Michelman Inc. Packaging material and container having interlaminate electrostatic shield and method of making same. 4,685,563, Cl. 206-328.000.

Cohnen, Erich; and Armah, Ben, to Beiersdorf Aktiengesellschaft. Substituted 5-phenylthio-6-amino-pyrimidinones, a process for their preparation and their use, and formulations containing these compounds. 4,686,223, Cl. 514-272.000.

Colburn, Everett L., Jr. Cattle/ewe estrus detector device. 4,685,421, Cl. 119-1.000.

Coldren, Daniel R., to AMP Incorporated. Electrical tab receptacle. 4,685,754, Cl. 439-270.000.

Coleman, Mike R.: *See*—
Cleary, Edward J., Jr.; and Coleman, Mike R., 4,686,390, Cl. 307-351.000.

Coleman, Robert L.: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Collier, John D.; and Scheeler, James W. Process for making wire mesh screens. 4,686,342, Cl. 219-58.000.

Collins, Ian P.; and Revell, William J., to Warner Lambert Technologies, Inc. Endoscope. 4,685,450, Cl. 128-4.000.

Colpaert, James J., to Allied Corporation. Disc brake assembly. 4,685,542, Cl. 188-72.300.

Coltene AG: *See*—
Schmid, Adalbert; Kiener, Alfons; Kagi, Stephan; and Claude, Jean P., 4,685,969, Cl. 106-35.000.

Colton, Robert M., to RCA Corporation. Current limited constant frequency dc converter. 4,686,617, Cl. 363-56.000.

Commissariat a l'Energie Atomique: *See*—
Picard, Bernard, 4,685,807, Cl. 356-401.000.

Commodore Business Machines, Inc.: *See*—
Radovsky, Jonathan S., 4,686,487, Cl. 330-288.000.

Comolli, Severino. Strap lock for suitcases, bags, or the like. 4,685,315, Cl. 70-68.000.

Compagnie d'Electronique et de Piezo-Electricite: *See*—
Debaisieux, Andre ; and Aubry, Jean P., 4,686,324, Cl. 174-17.050.

Compagnie Generale de Participations, S.A.: *See*—
Monestier, Jacques, 4,685,929, Cl. 623-64.000.

Compagnie Industrielle de Mecanismes en abrege C.I.M.: *See*—
Canadas, Jean C., 4,685,723, Cl. 296-97.00H.

Conducta Gesellschaft fur Mess-und Regeltechnik mbH + Co.: *See*—
Jackle, Heiner G., 4,686,011, Cl. 204-1.00T.

Conner, Randall C.; and Walworth, Van T., to American Cast Iron Pipe Company. Axially restrained pipe joint with improved locking ring structure. 4,685,708, Cl. 285-374.000.

Consolidated Systems, Inc.: *See*—
Meredith, Thomas C., Jr., 4,685,262, Cl. 52-232.000.

Continental Gummi-Werke Aktiengesellschaft: *See*—
Specht, Hans; and Kase, Walter, 4,685,190, Cl. 29-452.000.

Contois, Lawrence E.: *See*—
Ng, Yee Seung; Contois, Lawrence E.; Mitchell, John D.; and Walling, James D., 4,686,163, Cl. 430-47.000.

Control Data Corporation: *See*—
Shambroom, John R.; and Sliski, Alan P., 4,686,531, Cl. 340-870.370.

Conyers, Gregory P.: *See*—
Cramer, Eva B.; Milks, Linda C.; Conyers, Gregory P.; Valenti, Andrew; and Perez, Antonio, 4,686,190, Cl. 435-291.000.

Cooper, Christopher A., to Marley Tile A.G. Roof ridge capping system. 4,685,265, Cl. 52-277.000.

Copeland Corporation: *See*—
Yun, Kyung W.; Jones, Othel L.; and Long, Gerald M., 4,685,489, Cl. 137-543.150.

Coppola, Pat: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Corbet, Jean-Pierre: *See*—
Barriere, Jean-Claude; Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,686,309, Cl. 564-355.000.

Corbin, Susan E.; Brown, Cal R.; Crozier, David W.; and Williams, Peter C., to Whitey Co. Ball valve. 4,685,488, Cl. 137-328.000.

Corenman, James E.: *See*—
Goldberger, Daniel S.; Corenman, James E.; and McCord, Kenneth R., 4,685,464, Cl. 128-633.000.

Cory, Michael L.: *See*—
Booth, Dwight E.; and Cory, Michael L., 4,685,202, Cl. 29-607.000.

Cosentino, Victor A., Jr. Automatically-released arrow holder. 4,685,439, Cl. 124-41.00A.

Costar, Lowell W. Electrical connector. 4,685,752, Cl. 439-96.000.

Costello, Louis B., to Zenith Electronics Corporation. Reduced EMI noise in switched-mode power supply. 4,686,614, Cl. 363-17.000.

Cotrel, Claude: *See*—
Barriere, Jean-Claude; Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,686,309, Cl. 564-355.000.

Cousens, Donald E.: *See*—
Kurtz, John A.; Cousens, Donald E.; and Dufour, Mark D., 4,685,631, Cl. 242-47.000.

Cox, Raymond E.: *See*—
Ehrlich, Robert M.; and Cox, Raymond E., 4,686,106, Cl. 426-577.000.

Crabtree, Paul J.; and Imakawa, Kazuhiko, to Procter & Gamble Company, The. Detergent composition providing rinse cycle suds control containing a soap, a quaternary ammonium salt and a silicone. 4,686,060, Cl. 252-90.000.

Craemer, Robert H., to Molins Machine Company. Phase register control for printer-slotter machine. 4,685,394, Cl. 101-426.000.

Cramer, Eva B.; Milks, Linda C.; Conyers, Gregory P.; Valenti, Andrew; and Perez, Antonio, to Research Foundation of State University of New York, The. Device useful for growing and/or testing biological materials. 4,686,190, Cl. 435-291.000.

Cramer, Robert V.: *See*—
Allan, Thomas T.; and Cramer, Robert V., 4,685,944, Cl. 55-491.000.

Cramond, Patrick J.: *See*—
Mierau, Cameron D.; Cramond, Patrick J.; and Beer, Douglas C., 4,685,497, Cl. 144-176.000.

Cranston, Dean H.: *See*—
Spehrley, Charles W., Jr.; Schneider, Gary W.; Lipkie, Curtis A.; and Cranston, Dean H., 4,686,581, Cl. 358-294.000.

Crawford, James P. Auxiliary incinerator apparatus. 4,685,403, Cl. 110-194.000.

Cremer, Heinz P.; Wittig, W.; and Voss, Hans W., to Keiper Recaro GmbH & Co. Vehicle seat. 4,685,727, Cl. 297-180.000.

Cressey, John R., to Hayes Microcomputer Products, Inc. Digital data modulator and digital-to-analog converter. 4,686,490, Cl. 332-1.000.

Cricchi, James R.; and Blaha, Franklin C., to United States of America, Air Force. Direct moat self-aligned field oxide technique. 4,685,194, Cl. 437-41.000.

Croft, David C., to British Telecommunications Public Limited Company. Electronic switch with automatic protective turn-off followed by automatic reset. 4,686,383, Cl. 307-200.00B.

Crookston, Ronald W.; and Burney, Ivan T., to Westinghouse Electric Corp. Circuit interrupter having a chemical operator with double-acting drive means. 4,686,337, Cl. 200-148.00F.

Crown Creative Industries: *See*—
Payne, William J., 4,686,613, Cl. 362-413.000.

Crozier, David W.: *See*—
Corbin, Susan E.; Brown, Cal R.; Crozier, David W.; and Williams, Peter C., 4,685,488, Cl. 137-328.000.

Cselt-Centro Stude e Laboratori Telecomunicazione S.p.A.: *See*—
Bruno, Carlo M.; Panarotto, Gianfranco; and Tofanelli, Adler, 4,686,703, Cl. 379-410.000.

Cuellar, Raul D.: *See*—
Busta, Heinz H.; and Cuellar, Raul D., 4,685,996, Cl. 156-628.000.

Culp, Gordon W.: *See—*
Cable, Vaughn P.; Nason, Clyde K.; and Culp, Gordon W., 4,685,903, Cl. 604-154.000.

Cummins Engine Company, Inc.: *See—*
Johns, Kent I.; and Wohlmuth, Clinton J., 4,686,348, Cl. 219-121.0PY.

Cunningham, Robert L.; Rhodes, Charles R.; Angotti, Carl; and Warner, Paul H., to A. T. Hunn Company. Multiple speed pump electronic control system. 4,686,439, Cl. 318-335.000.

Cupples, Jerry S.: *See—*
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.

Curt, Valerian. Retaining wall. 4,685,838, Cl. 405-284.000.

Cvitas, Vilim; Faltejsek, Karl; Hanke, Reinhart; Janusch, Alois; and Larch, Gerhard, to Voest-Alpine Aktiengesellschaft. Solid jacket centrifuge. 4,685,899, Cl. 494-44.000.

Cycles Peugeot: *See—*
Deley, Serge; and Fourrey, Francois, 4,685,737, Cl. 297-408.000.

Cyl - Pak, Inc.: *See—*
Iverson, Dennis H., 4,685,685, Cl. 277-205.000.

Czech, Gunther: *See—*
Wiedmann, Helmut; and Czech, Gunther, 4,685,781, Cl. 351-110.000.

Czech, Manuel. Dispenser for paste-like products. 4,685,594, Cl. 222-182.000.

Czuba, Leonard: *See—*
Johnston, William D.; Czuba, Leonard; and Webster, R. D., 4,686,125, Cl. 428-35.000.

D.R.O.P.I.C.: *See—*
Lormeau, Jean-Claude; and Choay, Jean, 4,686,288, Cl. 536-21.000.

Dahlberg, Frank L.: *See—*
Fullilove, Tom P.; and Dahlberg, Frank L., 4,685,692, Cl. 280-234.000.

Dahlgren, Sven-Eric; Ekman, Douglas S.; and Ericsson, Claes E., to Boliden Aktiebolag. Granular product containing magnesium oxide as its main constituent. 4,686,105, Cl. 426-74.000.

Daikin Industries Ltd.: *See—*
Enjo, Naonori; Shinjo, Masayoshi; Okazaki, Yasuko; and Hayashi, Kazunori, 4,685,967, Cl. 106-13.000.

Daikin Kogyo Co., Ltd.: *See—*
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Daimler-Benz Aktiengesellschaft: *See—*
Klinkner, Walter; and Schmidt, Fritz, 4,685,698, Cl. 280-707.000.

Daimon, Akio: *See—*
Mitsuno, Tatsuyuki; Koyama, Teruhisa; Shinonaga, Hideo; and Daimon, Akio, 4,686,257, Cl. 524-449.000.

Dainippon Screen Mfg. Co., Ltd.: *See—*
Yokoi, Masakatsu; and Harada, Tsutomu, 4,686,359, Cl. 250-201.000.

Dalton, Donald A.; Strife, James R.; and Swindal, James L., to United Technologies Corporation. Buried laser mirror with a multicomponent reflective interlayer. 4,686,684, Cl. 372-99.000.

Daly, Michael J.; and Parr, David T., to BICC Public Limited Company. Optical fibre joint. 4,685,765, Cl. 350-96.210.

Dana Corporation: *See—*
Booth, Dwight E.; and Cory, Michael L., 4,685,202, Cl. 29-607.000.

Danfoss A/S: *See—*
Christiansen, Preben; Eskildsen, Christian; and Thomsen, Svend E., 4,685,295, Cl. 60-459.000.

D'Angelo, Charles: *See—*
Baldoni, J. Gary, II; and D'Angelo, Charles, 4,686,156, Cl. 428-698.000.

Danieli & C. Officine Meccaniche S.p.A.: *See—*
Fasano, Fulvio, 4,685,506, Cl. 164-416.000.

Danno, Yuji: *See—*
Ito, Akira; Danno, Yuji; and Kawashima, Kouzou, 4,686,422, Cl. 315-74.000.

Darcy, Paul J.: *See—*
Heller, Harold H.; Oliver, Stephen N.; Whittal, John; Johncock, William; Darcy, Paul J.; and Trundle, Clive, 4,685,783, Cl. 351-163.000.

Dario Manuli S.p.A.: *See—*
Brambilla, Dario, 4,685,270, Cl. 53-176.000.

Data Recording Instrument Company Limited: *See—*
O'Connor, Dermot J., 4,685,172, Cl. 16-2.000.

Datapoint Corporation: *See—*
Tompkins, E. Neal; Riley, Kim K.; Bartholmae, Jack N.; and Barry, Michael W., 4,686,698, Cl. 379-53.000.

Dauphinoise Thomson: *See—*
Nouvelle, Robert; and Segura, Jean L., 4,685,651, Cl. 251-11.000.

Davenport, Gerald E.: *See—*
Hicks, Harry H.; and Davenport, Gerald E., 4,685,316, Cl. 70-256.000.

Davis, Cecil J.; Carter, Duane E.; and Jucha, Rhett B., to Texas Instruments Incorporated. Apparatus for plasma assisted etching. 4,685,999, Cl. 156-643.000.

Davis, Pauls: *See—*
Schwartz, Ellen S.; Davis, Pauls; and Maxwell, Jerrold F., 4,686,058, Cl. 252-75.000.

Davis, Steven B., to Westinghouse Electric Corp. Auxiliary equipment mounting ring for electric meter. 4,686,461, Cl. 324-157.000.

Davison, Andrew J.: *See—*
Ellis, Ronald W.; Lowe, Robert S.; Keller, Paul M.; and Davison, Andrew J., 4,686,101, Cl. 424-88.000.

Davison, Francis L., to NL Industries, Inc. Self-adjusting valve actuator. 4,686,658, Cl. 367-85.000.

dcTEQ: *See—*
Dieffenbach, Harry N., 4,686,666, Cl. 369-290.000.

Deacon, Kim: *See—*
Lindemann, Martin K.; and Deacon, Kim, 4,686,260, Cl. 524-458.000.

Deal, Gregory K.; and Manco, Richard J., to Burroughs Corporation. Multi-purpose register for data and control paths having different path widths. 4,686,691, Cl. 377-54.000.

Dean, Robert R.: *See—*
Oswald, Norman D.; Mankey, Harry S.; Dean, Robert R.; and Hudler, Dennis W., 4,685,527, Cl. 180-14.300.

Debaisieux, Andre ; and Aubry, Jean P., to Compagnie d'Electronique et de Piezo-Electricite. Cold-seal package for withstanding high temperatures. 4,686,324, Cl. 174-17.050.

Debbaut, Christian A. M.; Shimirak, Gerald L.; and Swinmurn, John C., to Raychem Corporation. Protection of cable splice. 4,686,327, Cl. 174-88.00R.

Decker, William J. Underground pipe and cable laying machine. 4,685,832, Cl. 405-184.000.

DeCloux, Richard J. Climbing simulation exercise device. 4,685,666, Cl. 272-70.000.

DeCloux, Richard J. Descent speed control for exercise stair. 4,685,669, Cl. 272-130.000.

Deegener, Elmar; Voss, Hans W.; and Franzmann, Gunter, to Keiper Recaro GmbH & Co. Upholstery support for the back rest of a vehicle seat. 4,685,739, Cl. 297-452.000.

Deffner, John F.: *See—*
Young, Raymond R.; Deffner, John F.; and Barnes, Russell M., 4,685,574, Cl. 211-59.200.

Degoey, Larry W.: *See—*
Betz, Norman L.; and Degoey, Larry W., 4,686,205, Cl. 514-25.000.

Deguchi, Takayuki: *See—*
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Degussa Aktiengesellschaft: *See—*
Drauz, Karlheinz; and Kleemann, Axel, 4,686,010, Cl. 203-63.000.

Dejneka, Tamara: *See—*
Karanewsky, Donald S.; and Dejneka, Tamara, 4,686,298, Cl. 549-218.000.

De Jong, Jerry M.: *See—*
Dykstra, Ronald A.; Hawks, Mark W.; and De Jong, Jerry M., 4,686,609, Cl. 362-61.000.

De Keyzer, Rene M.; Vaes, Jos A.; and Berendsen, Jules R., to Agfa-Gevaert N.V. Method and material for the production of continuous tone silver images by the silver complex diffusion transfer reversal process. 4,686,174, Cl. 430-502.000.

DeLapp, Dennis W.; and Roebuck, Richard K., to DIT-MCO International Corp. Circuit board testing system. 4,686,467, Cl. 324-158.00F.

Deley, Serge; and Fourrey, Francois, to Cycles Peugeot. Adjustable headrest for a motor vehicle seat structure or the like. 4,685,737, Cl. 297-408.000.

Delfino, Michelangelo; and Cairns, Bruce R., to Fairchild Semiconductor Corporation. Plasma confinement in a low pressure electrically grounded R.F. heated reactor and deposition method. 4,686,113, Cl. 427-45.100.

Delker, Wilfried: *See—*
Derdack, Dieter; and Delker, Wilfried, 4,685,487, Cl. 137-315.000.

Dellinger, J. A.; Goins, Neal R.; and Reilly, Theresa A., to Mobil Oil Corporation. Matching P wave and shear wave sections in seismic exploration. 4,686,657, Cl. 367-75.000.

Demar, Lawrence E.; and Ritchie, Steven S., to Williams Electronics, Inc. Automatic replay control system and method for amusement devices. 4,685,677, Cl. 273-121.00A.

DeMarinis, Robert M.; and Straub, Kenneth M., to SmithKline Beckman Corporation. Use of 6-chloro-3-methyl-1H-2,3,4,5-tetrahydro-3-benzazepine-n-oxide, as a prodrug. 4,686,218, Cl. 514-213.000.

DeMeester, Gordon D.; and Mattson, Rodney A., to Picker International Inc. Computed tomography patient localization scanning. 4,686,692, Cl. 378-4.000.

Demmer, Walter H.: *See—*
Balaban, Alvin R.; Patel, Chandrakant B.; Demmer, Walter H.; and Harwood, Leopold A., 4,686,560, Cl. 358-19.000.

Denki Kagaku Kogyo Kabushiki Kaisha: *See—*
Iriuchijima, Shinobu; Kobayashi, Hirohiko; Aoki, Kyoji; Oda, Takeshi; Shinoyama, Masayuki; and Nosaka, Yoshifumi, 4,686,296, Cl. 548-544.000.

Denlinger, Keith R.; Rudy, William J., Jr.; and Stahl, Daniel E., to AMP Incorporated. Electrical plug header. 4,685,886, Cl. 439-55.000.

Denson, Lawrence K.: *See—*
Steenblik, Richard A.; Phillips, Asa R.; Mamay, Daniel P.; Denson, Lawrence K.; Tucker, Richard A.; and Clark, Jimmy M., 4,685,718, Cl. 296-154.000.

Denver Mineral Exploration Corp.: *See—*
Kober, Carl L.; and Procter-Gregg, H. David, 4,686,475, Cl. 324-349.000.

Denz, Helmut; and Stumm, Hans-Peter, to Robert Bosch GmbH. Safety device for a supercharged internal combustion engine. 4,685,435, Cl. 123-478.000.

Derdack, Dieter; and Delker, Wilfried, to American Standard Inc. Sanitary mixing valve. 4,685,487, Cl. 137-315.000.

Derks, Pierre L. L. M.; Lersmacher, Bernhard; and Lydtin, Hans-Jurgen, to U.S. Philips Corporation. Method for the manufacture of glass bodies. 4,685,946, Cl. 65-17.000.

Deseret Research, Inc.: *See*—
Olsen, Steven L.; Petrick, William R.; and Stodt, John A., 4,686,474, Cl. 324-331.000.

Deslauriers, Inc.: *See*—
Workman, Gary L., 4,685,267, Cl. 52-577.000.

De Smedt, Willy P.: *See*—
Vermeulen, Leon L.; Ghys, Theofiel H.; De Smedt, Willy P.; Vervloet, Ludovicus H.; and Callant, Paul R., 4,686,170, Cl. 430-244.000.

Desmond, Michael J.; and Pepera, Marc A., to Standard Oil Company, The. Method for the digestion-precipitation of high activity catalysts. 4,686,203, Cl. 502-331.000.

Detroit Edison Company: *See*—
Evans, James W., 4,686,641, Cl. 364-580.000.

Deutsche Thomson-Brandt GmbH: *See*—
Berland, Pierre-Axel; and Rufray, Jean-Claude, 4,686,432, Cl. 315-403.000.
Kuhn, Hans-Robert, 4,686,663, Cl. 369-46.000.

DeWalch, Norman B. Frangible seal. 4,685,317, Cl. 70-440.000.

Dickakian, Ghazi B.: *See*—
Atherton, Geroge A.; Dickakian, Ghazi B.; and Grant, Edward D., Jr., 4,686,048, Cl. 210-771.000.

Dickenson, Donald E.: *See*—
Zimmerman, Garyx; and Dickenson, Donald E., 4,686,107, Cl. 426-548.000.

Dickie, Robert G.; and Hobbins, Martin E., to Northern Technologies, Ltd. Conductive screen for video display unit. 4,686,576, Cl. 358-245.000.

Dictaphone Corporation: *See*—
Hipp, Betsy; Saltzman, Jeremy; and Dwyer, John J., 4,686,587, Cl. 360-74.200.

Diefenbach, Horst; and Geist, Michael, to BASF Farben + Fasern AG. Heat-hardenable binder mixture of amino resin and hydroxy epoxides. 4,686,249, Cl. 523-410.000.

Dieffenbach, Harry N., to dcTEQ. Flexible micro disk. 4,686,666, Cl. 369-290.000.

Dienes, Zoltan B., to Thomas & Betts Corporation. Method and apparatus for providing a spacer to a cable splice. 4,685,981, Cl. 156-48.000.

Diesel Kiki Co., Ltd.: *See*—
Iida, Katumi, 4,685,508, Cl. 165-17.000.
Kato, Yushi, 4,685,870, Cl. 417-500.000.

Dietlein, John E.; and Hampton, Thomas C., to Dow Corning Corporation. Intumescent foamable compositions. 4,686,244, Cl. 523-179.000.

Dietrich, Klaus. Photocathode for the infra-red range. 4,686,556, Cl. 357-30.000.

Diffracto Ltd.: *See*—
Liptay-Wagner, Nicholas; Renaud, Roland; Pryor, Timothy R.; and Clarke, Donald A., 4,686,374, Cl. 250-571.000.

DiFloria, Thomas J.: *See*—
Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.

Dillner, James R., to United Technologies Corporation. Workholder for securing a workpiece thereto. 4,685,660, Cl. 269-7.000.

DiRico, Mark A. Coating printed sheets. 4,685,414, Cl. 118-46.000.

Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., to Pneumo Corporation. Fluid actuator including composite cylinder assembly. 4,685,384, Cl. 92-166.000.

DIT-MCO International Corp.: *See*—
DeLapp, Dennis W.; and Roebuck, Richard K., 4,686,467, Cl. 324-158.00F.

Ditcher, Jack, to A-Lok Products Corporation. Apparatus for forming inverts and manhole assemblies. 4,685,650, Cl. 249-83.000.

Dixon, Glenn A.; McCloskey, Clark E.; Chambers, David L.; Hawk, Woodrow D.; and McCracken, Oliver W., to Otis Engineering Corporation. Well production controller system. 4,685,522, Cl. 166-372.000.

Dixon, John: *See*—
Baxter, Andrew J. G.; Dixon, John; Gould, Kenneth J.; and Tinker, Alan C., 4,686,217, Cl. 514-210.000.

Djordjevic, Ilija, to Robert Bosch GmbH. RPM governor for fuel injection pumps. 4,685,433, Cl. 123-373.000.

Doane, Joseph W.: *See*—
West, John L.; Doane, Joseph W.; and Zumer, Slobodan, 4,685,771, Cl. 350-347.00V.

Dobner, Michael H.; and Edwards, Evan A., to Bausch & Lomb Incorporated. Counterbalancing apparatus for use in an optical instrument. 4,685,648, Cl. 248-572.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
Srock, Rainer, 4,685,722, Cl. 296-188.000.

Dodin, Andre; Siffert, Odile; Le Thuillier, Georgette; and Allard, Patrice, to Institut Pasteur. Novel synthetic peptide, process for its preparation and medicaments containing it. 4,686,281, Cl. 530-327.000.

Doi, Isao: *See*—
Osawa, Izumi; Doi, Isao; and Natsuhara, Toshiya, 4,686,164, Cl. 430-63.000.

Don Whitley Scientific Limited: *See*—
Whitley, Donald C., 4,686,188, Cl. 435-287.000.

Dona, Valerio, to Miles Laboratories, Inc. Specific binding assay employing anti-G6PDH as label. 4,686,181, Cl. 435-7.000.

Donald, William W.: *See*—
Carlson, Steven J.; Donald, William W.; and Lepine, James J., 4,685,481, Cl. 134-155.000.

Donaldson, Robert L.: *See*—
Greanias, Evon C.; Guarnieri, C. Richard; Seeland, John J., Jr.; Verrier, Guy F.; and Donaldson, Robert L., 4,686,332, Cl. 178-19.000.

Donenfeld, Roger F. Endotracheal tube and method of intubation. 4,685,457, Cl. 128-207.140.

Donovan, William J.; and Sanford, George G., to Honeywell Inc. Electrical test apparatus. 4,686,627, Cl. 364-481.000.

Dorner Mfg. Corp.: *See*—
Joseph, Louis H., 4,685,556, Cl. 198-787.000.

Dornier System GmbH: *See*—
Forssmann, Bernd; Hepp, Wolfgang; Ackern, Klaus; and Chaussy, Christian, 4,685,461, Cl. 128-328.000.

Doryokuro Kakunenryo Kaihatsu Jigyodan: *See*—
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, 4,686,328, Cl. 174-153.00R.

Doucet, Jos: *See*—
Hall, Robert L.; Franckx, Joris R. I.; Overbergh, Noel M. M.; Doucet, Jos; and Vansant, Jan, 4,685,683, Cl. 277-1.000.

Dougherty, Lawrence W.; and Strauss, Paul, to Zenith Electronics Corporation. Color CRT front assembly with tension mask support. 4,686,416, Cl. 313-407.000.

Douglass, Duane: *See*—
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,685,384, Cl. 92-166.000.

Douno, Shugo; and Tomiyama, Hiroshi, to Glory Kogyo Kabushiki Kaisha. Method for confirming settled check cards and check card drawing apparatus. 4,686,357, Cl. 235-379.000.

Dow Chemical Company, The: *See*—
Harris, Robert F., 4,686,273, Cl. 528-196.000.
Harris, Robert F.; and Prier, Donald G., 4,686,274, Cl. 528-196.000.
Malhotra, Sudarshan K.; and Evoy, Ingrid L., 4,685,953, Cl. 71-86.000.
Myers, Michael O., 4,686,276, Cl. 528-371.000.
Pawloski, Chester E.; Wampfler, David J.; and Fielding, Donna J., 4,686,241, Cl. 521-107.000.
Pearson, Norman R.; and Kleschick, William A., 4,685,958, Cl. 71-93.000.
Rogers, Richard B.; and Goring, Cleve A. I., 4,685,959, Cl. 71-94.000.
Stuart, Glenn A., 4,685,420, Cl. 119-1.000.
Turner, Robert B.; Peffley, Richard D.; Plepys, Raymond A.; Priester, Ralph D.; Gonzales, Manuel, Jr.; and Bushman, Kimbley A., 4,686,242, Cl. 521-137.000.
Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., 4,686,314, Cl. 585-260.000.

Dow Corning Corporation: *See*—
Beck, Earl W.; and Brady, Sam A., 4,686,271, Cl. 528-15.000.
Dietlein, John E.; and Hampton, Thomas C., 4,686,244, Cl. 523-179.000.
Kasprzak, Kenneth A., 4,685,930, Cl. 8-139.100.

Dowden, Paul J., to DRG(UK) Limited. Rail car tipplers and tippler installations. 4,685,851, Cl. 414-361.000.

Dowell Schlumberger Incorporated: *See*—
Baranet, Sandra E.; Hodge, Richard M.; and Kucera, Clare H., 4,686,052, Cl. 252-8.551.

Dragsund, Inge: *See*—
Gjestrum, Einar; Dragsund, Inge; Skog, Just; and Selvag, Svein, 4,686,660, Cl. 367-153.000.

Drake, James F., to Minnesota Mining and Manufacturing Company. Method and kit for detecting antibiotics in a liquid sample. 4,686,182, Cl. 435-24.000.

Drauz, Karlheinz; and Kleemann, Axel, to Degussa Aktiengesellschaft. Process for the production of non-aqueous hydrogen peroxide solutions and their use. 4,686,010, Cl. 203-63.000.

Dreisin, Ilya. Method of and apparatus for forming filled dough products. 4,685,874, Cl. 425-132.000.

Dresser Industries, Inc.: *See*—
Bryan, John N., 4,686,625, Cl. 364-422.000.

Dressman, Jennifer B.: *See*—
Amidon, Gordon L.; Higuchi, Takeru; and Dressman, Jennifer B., 4,685,918, Cl. 604-892.000.

DRG(UK) Limited: *See*—
Dowden, Paul J., 4,685,851, Cl. 414-361.000.

Dromigny, Pierre; and Schottli, Theodore. Method, machine and mold for fabricating containers, made from an injected material, with a film forming an external coating. 4,686,076, Cl. 264-268.000.

Drug Package, Inc.: *See*—
Ringer, Donald A.; and Greco, Michael R., 4,685,271, Cl. 53-246.000.

Drury, Alvin C., to Jung Corporation. Apparatus for making an athletic supporter. 4,685,405, Cl. 112-121.150.

D'Silva, Themistocles D.: *See*—
Rao, Chennupati K.; and D'Silva, Themistocles D., 4,686,233, Cl. 514-469.000.

DSM Resins B.V.: *See—*
Van der Linde, Robert; and Rietberg, Johan, 4,686,270, Cl. 527-601.000.

Ducatman, Fred P.; and Flanagan, John D., to PharmaControl Corp. Stable sodium aspirin tablet compositions. 4,686,212, Cl. 514-161.000.

Duffin, Leon C.: *See—*
Roberts, Auston K.; Trainer, William E.; Nakamura, Steve; Duffin, Leon C.; and Biederman, David L., 4,686,094, Cl. 423-322.000.

Dufour, Mark D.: *See—*
Kurtz, John A.; Cousens, Donald E.; and Dufour, Mark D., 4,685,631, Cl. 242-47.000.

Dunbar, F. Curtiss: *See—*
Kilbane, Farrell M.; and Dunbar, F. Curtiss, 4,686,155, Cl. 428-653.000.

Dunshee, Wayne K., to Minnesota Mining and Manufacturing Company. Tamper indication system. 4,685,578, Cl. 215-230.000.

Du Pont de Nemours, E. I., and Company: *See—*
Christensen, Joel R.; Liang, Paul H.; and Thompson, Mark E., 4,685,955, Cl. 71-92.000.
Fahmy, Mohamed A. H., 4,686,209, Cl. 514-116.000.
Fountain, Frank S.; and Pusey, Donald K., 4,686,563, Cl. 360-38.100.
Johnson, Bruce B., 4,686,120, Cl. 427-370.000.
Krespan, Carl G., 4,686,300, Cl. 549-313.000.

Dupree, Hans-Werner. Outwardly pullable drawer or sliding tray for furniture. 4,685,751, Cl. 312-263.000.

Durif Varambon, Bruno: *See—*
Baviere, Marc; and Durif Varambon, Bruno, 4,686,053, Cl. 252-8.554.

Durr GmbH: *See—*
Klobenzer, Heinz; and Hosel, Peter, 4,686,049, Cl. 210-774.000.

Durrenberger, Willy. Process and equipment for heating a liquid without pollution of the environment. 4,685,444, Cl. 126-360.00A.

Dutcher, Alan P., to Oki America, Inc. Read back circuit for recovering data from magnetic storage medium. 4,686,586, Cl. 360-46.000.

Dvorak, Robert V.: *See—*
Lee, Keibock; and Dvorak, Robert V., 4,686,628, Cl. 364-481.000.

Dwyer, John J.: *See—*
Hipp, Betsy; Saltzman, Jeremy; and Dwyer, John J., 4,686,587, Cl. 360-74.200.

Dykstra, Ronald A.; Hawks, Mark W.; and De Jong, Jerry M., to Prince Corporation. Vehicle interior light. 4,686,609, Cl. 362-61.000.

Dynamic Disk: *See—*
Wray, Daniel X., 4,686,151, Cl. 428-607.000.

Dziewanowski, Andre ; Piotrowski, Krzysztof; and Zaremba, Krzysztof, to Mats Lundberg. Method of manufacturing extruded pipes and apparatus for carrying out the method. 4,686,075, Cl. 264-209.200.

E. R. Squibb & Sons, Inc.: *See—*
Ferguson, Keith T., 4,685,990, Cl. 156-253.000.
Karanewsky, Donald S.; and Dejneka, Tamara, 4,686,298, Cl. 549-218.000.
Liu, Wen-Chih; Parker, William L.; Singh, Pushpa; and Sykes, Richard B., 4,686,299, Cl. 549-271.000.

Eastlack, Thomas D.: *See—*
Van den Berg, Teunis T.; and Eastlack, Thomas D., 4,686,041, Cl. 210-335.000.

Eastlund, Bernard J., to APTI, Inc. Method and apparatus for altering a region in the earth's atmosphere, ionosphere, and/or magnetosphere. 4,686,605, Cl. 361-231.000.

Eastman Kodak Company: *See—*
Burnham, William L., 4,685,788, Cl. 354-121.000.
Lovely, John D., 4,686,582, Cl. 358-310.000.
Ng, Yee Seung; Contois, Lawrence E.; Mitchell, John D.; and Walling, James D., 4,686,163, Cl. 430-47.000.

Eastman, William J.: *See—*
Iversen, Alfred A.; Eastman, William J.; and Van Beek, Allen L., 4,685,447, Cl. 128-1.00R.

Eaton Corporation: *See—*
Baranyi, Sandor J., 4,685,815, Cl. 400-120.000.
Schachameyer, Steven R.; Benjamin, James A.; Pardee, John B.; and Hoppie, Lyle O., 4,685,976, Cl. 437-173.000.

Eaton, Homer L., to MTS Vektronics Corporation. Reel and reel handling system. 4,685,636, Cl. 242-129.000.

Eberhart, Laurence L.; and Holben, Larry B., to Peabody Noise Control, Inc. Sound rated floor system and method of constructing same. 4,685,259, Cl. 52-144.000.

Eby, Lawrence T.: *See—*
Struss, Arthur W.; Williams, Terrance L.; and Eby, Lawrence T., 4,686,253, Cl. 524-44.000.

Eck, Paul L., to Abbott Laboratories. Combined washer and aspirator. 4,685,480, Cl. 134-182.000.

Eckardt, Fred H., to EMCO Filtration Systems, Inc. Gravity liquid filtration apparatus with rotatable discs that mount swinging discharge elements therebetween. 4,686,042, Cl. 210-386.000.

Eckstein, John P.: *See—*
Schaefer, Suzanne E.; and Eckstein, John P., 4,685,591, Cl. 222-107.000.

Eddy, Frederick N., to United States of America, Air Force. Retro directive radar and target simulator beacon apparatus and method. 4,686,534, Cl. 342-165.000.

Edelstein, Fred; Haslett, Robert A.; Kosson, Robert L.; and Harwell, William, to Grumman Aerospace Corporation. Capillary-pumped heat transfer panel and system. 4,685,512, Cl. 165-104.140.

Edward Weck & Company, Inc.: *See—*
Thornton, Curtis W., 4,685,460, Cl. 128-321.000.

Edwards, Charles W., to Westinghouse Electric Corp. Low dissipation capacitor voltage sharing circuit for a static AC/DC converter. 4,686,619, Cl. 363-126.000.

Edwards, David S.: *See—*
Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., 4,686,314, Cl. 585-260.000.

Edwards, David V., to R.F.D. Limited. Inflatable lifejacket. 4,685,890, Cl. 441-94.000.

Edwards, Evan A.: *See—*
Dobner, Michael H.; and Edwards, Evan A., 4,685,648, Cl. 248-572.000.

Edwards, Floyd V.; and Shah, Hasmukh, to Becton, Dickinson and Company. Disposable reservoir cassette. 4,685,902, Cl. 604-153.000.

Edwards, Gregory S. Combined child safety car seat and stroller. 4,685,688, Cl. 280-30.000.

Effem GmbH: *See—*
Kiel, Hans R., 4,685,276, Cl. 53-459.000.

Efron, Uzi: *See—*
Soffer, Bernard H.; Efron, Uzi; and Marom, Emanuel, 4,686,647, Cl. 364-850.000.

Eguchi, Tadashi: *See—*
Migita, Yoshihiro; Eguchi, Tadashi; Kumazawa, Yukinari; Nakagami, Jozi; Amano, Takehiro; Sota, Kaoru; and Sakakibara, Jinsaku, 4,686,292, Cl. 544-343.000.

Ehrenfels, Alfred L.: *See—*
Boteler, William C.; and Ehrenfels, Alfred L., 4,686,381, Cl. 307-147.000.

Ehrlich, Robert M.; and Cox, Raymond E., to General Foods Corporation. Pectin food product. 4,686,106, Cl. 426-577.000.

Ehrlinger, Friedrich J.; Muller, Franz; Simon, Herbert; and Sailer, Hubert, to Zahnradfabrik Friedrichshafen AG. Powershift gearbox/-transmission. 4,685,343, Cl. 74-331.000.

Eichhorn, Uwe: *See—*
Gliemeroth, Georg; Ross, Ludwig; Eichhorn, Uwe; Hoelzel, Eva G.; and Speit, Burkhard, 4,686,196, Cl. 501-13.000.

Eickhoff, Alvin M.: *See—*
Goeser, Maurice N.; and Eickhoff, Alvin M., 4,685,857, Cl. 414-522.000.

Eickmann, Karl. Multiple stroke radial piston machine. 4,685,380, Cl. 91-488.000.

Eickmann, Karl. Pivot portion of a piston shoe in fluid machines. 4,685,381, Cl. 91-488.000.

Eigenmann, Ludwig. Road marking provided with protruding elements capable of resisting to snow plowing implements. 4,685,824, Cl. 404-9.000.

Eikoh Giken Co., Ltd.: *See—*
Ohnari, Eiji, 4,686,379, Cl. 307-66.000.

Eisenreich, Norbert: *See—*
Kugler, Hans-Peter; Eisenreich, Norbert; and Liehmann, Wolfgang, 4,685,804, Cl. 356-373.000.

Eising, John P., to A. O. Smith Corporation. Submersible chamber water heater. 4,685,425, Cl. 122-17.000.

Ekman, Douglas S.: *See—*
Dahlgren, Sven-Eric; Ekman, Douglas S.; and Ericsson, Claes E., 4,686,105, Cl. 426-74.000.

Elbe, Hans-Ludwig: *See—*
Lantzsch, Reinhard; and Elbe, Hans-Ludwig, 4,686,291, Cl. 544-335.000.

ELCAT Direzione Sviluppo S.p.A.: *See—*
Brandoli, Luigi, 4,685,734, Cl. 297-355.000.

Electric Power Research Institute, Inc.: *See—*
Fisher, David J., 4,686,192, Cl. 436-60.000.

Electricite de France Service National: *See—*
Veysset, Jean-Paul; Camp, Jean-Jacques; and Noel, Didier, 4,686,067, Cl. 252-626.000.

Electro Minerals (Canada), Inc.: *See—*
Seider, Robert J.; Guichelaar, Philip J.; and Anderson, Robert O., 4,686,032, Cl. 209-8.000.

Electro-Voice, Inc.: *See—*
Gunness, David W., 4,685,532, Cl. 181-185.000.

Elektro Automaten Verstraeten PVBA: *See—*
Verstraeten, Achiel, 4,685,673, Cl. 273-1.0GC.

Elliott, John D.: *See—*
Bonilla, Jorge A.; and Elliott, John D., 4,686,027, Cl. 208-39.000.

Elliott, Jon S. Electrical wire connector and connection method. 4,685,757, Cl. 439-426.000.

Ellis, Edward J.; and Ellis, Jeanne Y., to Polymer Technology Corporation. Fluorine containing polymeric compositions useful in contact lenses. 4,686,267, Cl. 526-245.000.

Ellis, Jeanne Y.: *See—*
Ellis, Edward J.; and Ellis, Jeanne Y., 4,686,267, Cl. 526-245.000.

Ellis, Ronald W.; Lowe, Robert S.; Keller, Paul M.; and Davison, Andrew J., to Merck & Co., Inc. Vaccine against varicella-zoster virus. 4,686,101, Cl. 424-88.000.

Elmec Corporation: *See—*
Kameya, Kazuo, 4,686,495, Cl. 333-156.000.

Elsasser, Michael; and Stohr, Roland, to International Business Machines Corporation. Buckling beam test probe assembly. 4,686,464, Cl. 324-158.00P.

Elsfelder, Leonard. Display tray with reversible inserts. 4,685,568, Cl. 206-561.000.

Eltex-Elektrostatik Gesellschaft mbH: *See—*
Hahne, Ernst A.; and Kunzig, Hermann, 4,686,069, Cl. 261-92.000.

Elvin, Frank J., to ChemCat Corporation. Catalyst demetallization and process for using demetallized catalyst. 4,686,197, Cl. 502-22.000.

EMCO Filtration Systems, Inc.: *See—*
Eckardt, Fred H., 4,686,042, Cl. 210-386.000.
Emerson Electric Co.: *See—*
Behr, Joseph L., 4,685,309, Cl. 62-212.000.
Gehrt, Louis M., 4,686,401, Cl. 310-68.00E.
Emhart Industries, Inc.: *See—*
Liska, Timothy J.; and Scott, Paul F., 4,685,947, Cl. 65-29.000.
Emter, James. Guide pad resurfacing apparatus. 4,685,845, Cl. 409-145.000.
Endo, Itaru: *See—*
Inoue, Yasuo; Yonekubo, Ken; Yamagishi, Masaaki; and Endo, Itaru, 4,685,776, Cl. 350-502.000.
Endo, Junji: *See—*
Arai, Tohru; and Endo, Junji, 4,686,117, Cl. 427-249.000.
Endo, Keiji: *See—*
Takahashi, Naoya; Endo, Keiji; Matsuzaka, Eiichi; Narui, Satoshi; and Sato, Atsushi, 4,686,548, Cl. 503-213.000.
Endo, Sasuke. Toothbrush. 4,685,819, Cl. 401-176.000.
Endo, Yoshihiro; Mizukami, Etsuo; Kishishita, Hiroshi; and Uede, Hisashi, to Sharp Kabushiki Kaisha. Method for preparing a thin-film electroluminescent display panel comprising a thin metal oxide layer and thick dielectric layer. 4,686,110, Cl. 427-38.000.
Engelhardt, Friedrich: *See—*
Keil, Karl-Heinz; Wullbrandt, Dieter; Keller, Reinhold; and Engelhardt, Friedrich, 4,686,243, Cl. 521-149.000.
Engeli, Ernst: *See—*
Slavik, Walter; Engeli, Ernst; and Lattion, Andre , 4,685,283, Cl. 57-263.000.
Engell, John E.; and Mortensen, Svend, to Radiometer A/S. Ion-selective measuring electrode device. 4,686,012, Cl. 204-1.00T.
English, James D.: *See—*
Ritchey, Mary B.; Cano, Francis R.; O'Hara, Gerald J.; English, James D.; and Lin, Wenlii, 4,686,102, Cl. 424-92.000.
Enjo, Naonori; Shinjo, Masayoshi; Okazaki, Yasuko; and Hayashi, Kazunori, to Daikin Industries Ltd. Deicing coating composition. 4,685,967, Cl. 106-13.000.
Enloe, Kenneth M., to Kimberly-Clark Corporation. Elastic waist for disposable absorbent garment. 4,685,916, Cl. 604-385.00A.
Environmental Air Contractors, Inc.: *See—*
Rogalla, Lyle H., 4,686,121, Cl. 427-378.000.
Environmental Products & Services Co., Inc.: *See—*
Lewis, Robert L., Jr.; and Hudson, J. Albert, 4,685,586, Cl. 220-305.000.
Epic Metals Corporation: *See—*
Landis, Donald H., 4,685,264, Cl. 52-252.000.
Equipements Automobiles Marchal: *See—*
Palmier, Rene G.; Perrier, Pierre P.; and Phounsombath, Sing K., 4,686,501, Cl. 335-256.000.
Erhardt, Harry G., to RCA Corporation. Line-sequential read out of a phototsensor array via a CCD shift register clocked at a multiple of pixel scan rate. 4,686,574, Cl. 358-213.260.
Ericsson, Claes E.: *See—*
Dahlgren, Sven-Eric; Ekman, Douglas S.; and Ericsson, Claes E., 4,686,105, Cl. 426-74.000.
Erlenbach, Hans. Machine for the production of molded parts from foamed plastic. 4,685,872, Cl. 425-4.00R.
Erwied, Werner; Upadek, Horst; and Wegemund, Bernd, to Henkel Kommanditgesellschaft auf Aktien. Stabilized polyvinyl chloride molding compositions. 4,686,255, Cl. 524-104.000.
Esakoff, Greg F.: *See—*
Lakoski, Robert P.; and Esakoff, Greg F., 4,685,312, Cl. 70-14.000.
Escaravage, Gerard, to Aciers et Outillage Peugeot. Buckle, especially for a safety belt for an automobile vehicle. 4,685,177, Cl. 24-641.000.
Escher Wyss GmbH: *See—*
Biondetti, Mario; and Baur, Roland, 4,686,005, Cl. 162-60.000.
Eskandry, Ezra D.: *See—*
Farrar, James G.; and Eskandry, Ezra D., 4,686,513, Cl. 340-572.000.
Eskildsen, Christian: *See—*
Christiansen, Preben; Eskildsen, Christian; and Thomsen, Svend E., 4,685,295, Cl. 60-459.000.
Essig, Robert A. Method and apparatus for forming cube of frozen liquid. 4,685,304, Cl. 62-68.000.
Essilor International (Compagnie Generale d'Optique): *See—*
Lhospice, Bernard, 4,685,782, Cl. 351-130.000.
Estabrook, Mark R., to Barnes Drill Co. Cylindrical drum magnetic separator. 4,686,035, Cl. 210-137.000.
ETA Thermal Systems Corporation: *See—*
Sisk, Robert A., 4,686,378, Cl. 290-2.000.
Etablissements Linguanotto: *See—*
Linguanotto, Louis, 4,685,730, Cl. 297-316.000.
Etak, Inc.: *See—*
Buxton, James L.; Phillips, Alan C.; and Honey, Stanley K., 4,686,642, Cl. 364-607.000.
Ethyl Corporation: *See—*
Jackisch, Philip F., 4,686,311, Cl. 570-193.000.
Eugui, Elsie M.: *See—*
Nelson, Peter H.; Allison, Anthony C.; and Eugui, Elsie M., 4,686,234, Cl. 514-469.000.
Eujitsu Limited: *See—*
Ono, Yoshinobu; and Watanabe, Yoshio, 4,685,551, Cl. 198-346.200.
Evans, James W., to Detroit Edison Company. Static programmable powerline carrier channel test structure and method. 4,686,641, Cl. 364-580.000.
Evans, Kerry G.: *See—*
Nuckolls, Joe A.; and Evans, Kerry G., 4,686,424, Cl. 315-86.000.
Evoy, Ingrid L.: *See—*
Malhotra, Sudarshan K.; and Evoy, Ingrid L., 4,685,953, Cl. 71-86.000.
Ex-Cell-O Corporation: *See—*
Hinman, Edmund R., 4,686,020, Cl. 204-129.100.
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Atherton, Geroge A.; Dickakian, Ghazi B.; and Grant, Edward D., Jr., 4,686,048, Cl. 210-771.000.
Ryan, Jack L.; Bray, Lane A.; and Boldt, Allyn L., 4,686,019, Cl. 204-1.500.
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Eydt, Christopher A., to Safety Solutions Co. Inc. Automotive headlight control. 4,686,423, Cl. 315-82.000.
Fahmy, Mohamed A. H., to Du Pont de Nemours, E. I., and Company. Certain N-(substituted-aminosulfinyl)phosphonamidothioate and dithioate pesticides. 4,686,209, Cl. 514-116.000.
Fai, Cheung K.: *See—*
Rubik, Erno; and Fai, Cheung K., 4,685,681, Cl. 273-155.000.
Fairchild Camera & Instrument Corp.: *See—*
Lee, Keibock; and Dvorak, Robert V., 4,686,628, Cl. 364-481.000.
Fairchild Semiconductor: *See—*
Lam, Nim C., 4,686,394, Cl. 307-455.000.
Lam, Nim C., 4,686,674, Cl. 370-112.000.
Fairchild Semiconductor Corporation: *See—*
Delfino, Michelangelo; and Cairns, Bruce R., 4,686,113, Cl. 427-45.100.
Kurtz, John A.; Cousens, Donald E.; and Dufour, Mark D., 4,685,631, Cl. 242-47.000.
Fairey, Brian M.: *See—*
Mazumder, Ali T.; and Fairey, Brian M., 4,685,816, Cl. 400-157.100.
Falteisek, Karl: *See—*
Cvitas, Vilim; Faltejsek, Karl; Hanke, Reinhart; Janusch, Alois; and Larch, Gerhard, 4,685,899, Cl. 494-44.000.
Falzone, Timothy F.; and Schettino, Anthony J., to Polaroid Corporation. Film cassette. 4,685,791, Cl. 354-277.000.
Falzoni, Pierino, to Officina Meccanica Fratelli Falzoni S.d.f. Multi-use machine for the application of small metallic and non-metallic workpieces or items and with total interchangeability of equipment and related fittings. 4,685,604, Cl. 227-18.000.
Fannin, Wayne V.; and Buchanan, Harry C., Jr., to General Motors Corporation. Hydraulic damper for vehicles with variable orifice piston valving for varying damping force. 4,685,545, Cl. 188-299.000.
Farago, Steven, to Anico Research, Ltd. Inc.; and Rapitech Systems Inc., a part interest to each. Multiple connector interface. 4,686,506, Cl. 340-347.0DD.
Farber, Milton: *See—*
Worns, John R.; Farber, Milton; and Hughes, David T., 4,686,172, Cl. 430-286.000.
Farbood, Mohamad I.; Morris, James A.; and Seitz, Eugene W., to International Flavors & Fragrances Inc. Preparation of naturally-occurring C_2–C_5 alkyl esters of C_4–C_5 carboxylic acids by means of fermentation of C_5–C_6 amino acids in the presence of C_2–C_5 alcohols. 4,686,307, Cl. 560-205.000.
Farge, Daniel: *See—*
Barriere, Jean-Claude; Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,686,309, Cl. 564-355.000.
Faria, Carl R.; and Snouse, Thomas W., to Thermionics Laboratory, Inc. Seal structure for metal vacuum joint. 4,685,193, Cl. 29-558.000.
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Fasano, Fulvio, to Danieli & C. Officine Meccaniche S.p.A. Billet launching device in continuous casting machines. 4,685,506, Cl. 164-416.000.
Fazekas, Peter: *See—*
Feuerbaum, Hans-Peter; and Fazekas, Peter, 4,686,466, Cl. 324-158.00R.
Lassmann, Reiner; Krupp, Albert; and Fazekas, Peter, 4,686,455, Cl. 324-73.00R.
Fehringer, Friedrich: *See—*
Krennbauer, Franz; and Fehringer, Friedrich, 4,685,970, Cl. 106-100.000.
Feinman, Jerome: *See—*
Howell, John L.; McGreal, Joseph E., Jr.; Nemeth, Edward J.; Waslo, Stephen; and Feinman, Jerome, 4,686,090, Cl. 423-244.000.
Feinmetall GmbH: *See—*
Kruger, Gustav, 4,686,465, Cl. 324-158.00P.
Fendley, James R., to Zenith Electronics Corporation. CRT color convergence measurement. 4,686,429, Cl. 315-368.000.
Fennell, Lillie. Compartmentalized portable garden with raised center. 4,685,246, Cl. 47-66.000.
Ferdinandi, Eckhardt S.; Mobilio, Dominick; Sabatucci, Joseph P.; and Humber, Leslie G., to American Home Products Corporation. Substituted 1,3,4,9-tetrahydropyrano(3,4-b)indole-1-acetic acids. 4,686,213, Cl. 514-161.000.
Ferguson, Keith T., to E. R. Squibb & Sons, Inc. Ostomy bag coupling. 4,685,990, Cl. 156-253.000.
Ferguson, Michael J., to Ferranti, plc. Power supply circuit. 4,686,615, Cl. 363-17.000.
Fernando, Ranjit S.: *See—*
Regas, Jennine; and Fernando, Ranjit S., 4,685,471, Cl. 128-734.000.
Ferranti, plc: *See—*
Ferguson, Michael J., 4,686,615, Cl. 363-17.000.

Ferrari, Hubert, to Societe Coninentale du Carton Ondule Socar. Apparatus comprising planar elements which may be assembled together to form a structure. 4,685,609, Cl. 229-15.000.

Ferrer, Enrique; and Schlosser, Charles M., to Motorola, Inc. Method of encoding and decoding data signals. 4,686,528, Cl. 340-825.440.

Ferro Manufacturing Corporation: *See—*
Hammond, Albert J., 4,685,248, Cl. 49-352.000.
McFalls, Bob L.; Myers, Timothy S.; and Fudala, Chester, 4,685,735, Cl. 297-362.000.

Fertimont S.p.A.: *See—*
Majer, Rocco, 4,686,115, Cl. 427-212.000.

Feuerbaum, Hans-Peter; and Fazekas, Peter, to Siemens Aktiengesellschaft. Method for automatically setting the voltage resolution in particle beam measuring devices and apparatus for implementation thereof. 4,686,466, Cl. 324-158.00R.

Fichtel & Sachs AG: *See—*
Brunken, Gerd; Gob, Werner; and Reis, Oswald, 4,685,549, Cl. 192-58.00B.

Fick, Heinz: *See—*
Bauer, Karl-Heinz; and Fick, Heinz, 4,685,350, Cl. 74-500.00R.

Fick, Herbert J., to Bergquist Company, The. Method of preparing interfacings of heat sinks with electrical devices. 4,685,987, Cl. 156-247.000.

Fielding, Donna J.: *See—*
Pawloski, Chester E.; Wampfler, David J.; and Fielding, Donna J., 4,686,241, Cl. 521-107.000.

Fifield, Charles C.; Mayes, Richard T.; Tate, Marilyn; and Varnell, Daniel F., to Hercules Incorporated. Photopolymerizable films containing plasticizer silica combinations. 4,686,171, Cl. 430-273.000.

Figala, Volker: *See—*
Rainer, Georg; Figala, Volker; and Kohl, Bernhard, 4,686,230, Cl. 514-338.000.

Filiz, Alain; and Ascolese, Salvatore J., to L'Oreal, S.A. Cosmetic compact with pinless internal hinge. 4,685,558, Cl. 206-1.500.

Fillers, Wayne L. Guessing game and associated playing method. 4,685,672, Cl. 273-1.00R.

Fingerhut, Arthur L.; and Fingerhut, Howard W., to Fingerhut, Arthur L. Composite insulation material. 4,685,155, Cl. 2-272.000.

Fingerhut, Howard W.: *See—*
Fingerhut, Arthur L.; and Fingerhut, Howard W., 4,685,155, Cl. 2-272.000.

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Spigarelli, Donald J.; Peck, Douglas J.; and Finney, James L., 4,685,605, Cl. 228-37.000.

Finnigan Corporation: *See—*
Louris, John N.; Syka, John E. P.; and Kelley, Paul E., 4,686,367, Cl. 250-290.000.

First Brands Corporation: *See—*
Payerle, Norman E., 4,686,059, Cl. 252-75.000.

Fischer MET GmbH: *See—*
Koch, Rainer; and Stockert, Rudiger, 4,685,459, Cl. 128-303.170.

Fisher, Barbara J.: *See—*
Harvey, Ian E.; Williams, David G.; Fisher, Barbara J.; and Johnson, Timothy J., 4,686,384, Cl. 307-202.100.

Fisher, David J., to Electric Power Research Institute, Inc. Method for detecting impurities in an oil sample. 4,686,192, Cl. 436-60.000.

Fisons plc: *See—*
Baxter, Andrew J. G.; Dixon, John; Gould, Kenneth J.; and Tinker, Alan C., 4,686,217, Cl. 514-210.000.

Fitzpatrick, Denis: *See—*
Bartos, Dezso S.; and Fitzpatrick, Denis, 4,686,194, Cl. 436-536.000.

Flaherty, Kenneth A.; Huber, Daniel J.; and Lewis, Robert T., to Brown & Williamson Tobacco Corporation. Apparatus for binding packages together. 4,685,993, Cl. 156-475.000.

Flanagan, John D.: *See—*
Ducatman, Fred P.; and Flanagan, John D., 4,686,212, Cl. 514-161.000.

Flanders Filters, Inc.: *See—*
Allan, Thomas T.; and Cramer, Robert V., 4,685,944, Cl. 55-491.000.

Flanigen, Edith M.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., to Union Carbide Corporation. Molecular sieve compositions with aluminum, phosphorus and at least two other elements. 4,686,093, Cl. 423-306.000.

Flanigen, Edith M.: *See—*
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,686,092, Cl. 423-306.000.

Fleuren, Petrus A. M.: *See—*
van der Heijden, Antonius W. F.; and Fleuren, Petrus A. M., 4,685,891, Cl. 445-36.000.

Flexi-Coil Ltd.: *See—*
Kelm, Daniel W., 4,685,843, Cl. 406-181.000.

Flint, Ephraim B.; Gruber, Peter A.; Marks, Ronald F.; Olive, Graham; and Zingher, Arthur R., to International Business Machines Corporation. Oxide-free extruded thermal joint. 4,685,606, Cl. 228-123.000.

Flora, Laurence P., to Unisys Corporation. Apparatus and method for detecting time-related faults. 4,686,677, Cl. 371-61.000.

Fluks, Marten: *See—*
Cadee, Theodorus P. M.; Van der Veen, Siebren C.; and Fluks, Marten, 4,685,353, Cl. 74-689.000.

FMC Corporation: *See—*
Harris, Robert M.; and Anderson, Neil G., 4,685,412, Cl. 114-238.000.
Shearon, Charles W.; Berticevich, Edward N.; and Billett, Ronald J., 4,685,214, Cl. 30-391.000.

Fockens, Tallienco W. H., to N.V. Nederlandsche Apparatenfabriek NEDAP. Field disturbance detection system. 4,686,517, Cl. 340-572.000.

Fohl, Artur, to TRW Repa GmbH. Means for securing a child's seat on a vehicle seat by means of a normal three-point automatic safety belt system. 4,685,740, Cl. 297-468.000.

Folch, Carlos M.: *See—*
Bacardit, Juan S.; and Folch, Carlos M., 4,685,301, Cl. 60-562.000.

Foote, Danny R.; and Turner, Wayne O., to Berkley and Company, Inc. Graphite fiber fishing rod. 4,685,241, Cl. 43-18.500.

Ford Aerospace & Communications Corp.: *See—*
Bains, William R., 4,685,639, Cl. 244-3.220.

Ford, Lindy R. Position selectable delay generator for mechanism trigger. 4,685,330, Cl. 73-167.000.

Ford Motor Company: *See—*
Beckwith, Elaine C.; and Williams, Robert M., 4,686,095, Cl. 423-324.000.
Meitzler, Allen H., 4,686,406, Cl. 310-322.000.
Novak, Robert F.; and Weber, Neill, 4,686,320, Cl. 136-239.000.

Ford, Robert E. Mineshaft closures. 4,685,830, Cl. 405-133.000.

Foreman, Dennis. Tandem water ski towing device. 4,685,413, Cl. 114-253.000.

Forrester, James T., deceased: *See—*
Padget, John C.; and Forrester, James T., deceased, 4,686,278, Cl. 528-495.000.

Forrester, Mary, executor: *See—*
Padget, John C.; and Forrester, James T., deceased, 4,686,278, Cl. 528-495.000.

Forssmann, Bernd; Hepp, Wolfgang; Ackern, Klaus; and Chaussy, Christian, to Dornier System GmbH. Apparatus and method for triggering shock waves in lithotripsy. 4,685,461, Cl. 128-328.000.

Fossum, Eric R., to Hughes Aircraft Company. Charge coupled device differencer. 4,686,648, Cl. 364-862.000.

Foster Wheeler Development Corporation: *See—*
Schroeder, Joseph W.; and Ahluwalia, Kawaljit S., 4,685,205, Cl. 29-727.000.

Foster Wheeler USA Corporation: *See—*
Bonilla, Jorge A.; and Elliott, John D., 4,686,027, Cl. 208-39.000.

Fountain, Frank S.; and Pusey, Donald K., to Du Pont de Nemours, E. I., and Company. Apparatus and method for locating dropouts. 4,686,563, Cl. 360-38.100.

Fourrey, Francois: *See—*
Deley, Serge; and Fourrey, Francois, 4,685,737, Cl. 297-408.000.

Fowler, David E., to Quadrex HPS, Inc. Process for removing PCB's from electrical apparatus. 4,685,972, Cl. 134-12.000.

Fowler, James E.: *See—*
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Fralick, Ilo. Ice fishing tip-up. 4,685,240, Cl. 43-17.000.

Fralick, William L.: *See—*
Pensabene, Saverio F.; West, Jon K.; Leclair, Robert A.; Van Conant, Carl F.; Catotti, Arthur J.; and Fralick, William L., 4,686,013, Cl. 204-2.100.

Franckx, Joris R. I.: *See—*
Hall, Robert L.; Franckx, Joris R. I.; Overbergh, Noel M. M.; Doucet, Jos; and Vansant, Jan, 4,685,683, Cl. 277-1.000.

Franzmann, Gunter: *See—*
Deegener, Elmar; Voss, Hans W.; and Franzmann, Gunter, 4,685,739, Cl. 297-452.000.

Fraunhofer-Gesellschaft zur Forderung der Angewadten Forschung e. V.: *See—*
Kugler, Hans-Peter; Eisenreich, Norbert; and Liehmann, Wolfgang, 4,685,804, Cl. 356-373.000.

Frederiksen, Jeffrey E., to Bally Manufacturing Corporation. Position transducer system for a joystick. 4,685,678, Cl. 273-148.00B.

Freeman, Floyd. Portable wood processing machine. 4,685,495, Cl. 144-3.00K.

Freiberg, Leslie A.; and Bacino, David J., to Abbott Laboratories. Erythromycin A 11,12-carbonates and method of use. 4,686,207, Cl. 514-29.000.

Freiman, Oscar H.: *See—*
Paschal, James H., Jr.; Freiman, Oscar H.; and Kernal, Dickie L., 4,685,523, Cl. 166-378.000.

Freimark, Bruce: *See—*
Marsico, Ronald; and Freimark, Bruce, 4,686,325, Cl. 174-40.00R.

Freund, Friedemann. Method of processing high purity low-OH vitreous silica fibers. 4,685,945, Cl. 65-4.210.

Frey, Bernhard, to Hydrowatt Systems Ltd. Cylinder-piston combination, particularly for high-pressure application. 4,685,382, Cl. 92-86.500.

Frick Company: *See—*
Stegmann, Rudolph; and Mandy, Zoltan A., 4,685,310, Cl. 62-217.000.

Friday, John R.: *See—*
Van Driesen, Roger P.; and Friday, John R., 4,686,028, Cl. 208-86.000.

Friedland, David J.: *See—*
Shia, George A.; and Friedland, David J., 4,686,161, Cl. 429-50.000.

Friedrick Maurer Sohne GmbH & Co. KG: *See—*
Buckenauer, Gunter, 4,685,825, Cl. 404-65.000.

Fritch, Charles D. Intraocular lens. 4,685,920, Cl. 623-6.000.

Fritsch, Rudolf P. Apparatus for producing long-chain polymers, especially polyesters. 4,686,088, Cl. 422-135.000.

Fronius, Joe E., to Turn-N-Tame Inc. Hair brush. 4,685,165, Cl. 15-27.000.

Frye, David E. Cloth stitching apparatus and method. 4,685,408, Cl. 112-262.300.

Frye, Richard D.: *See*—
Woods, Timothy N.; and Frye, Richard D., 4,685,216, Cl. 33-176.000.

Fuchizawa, Tetsuro: *See*—
Koike, Kazuyuki; Tamagawa, Shigehisa; and Fuchizawa, Tetsuro, 4,686,546, Cl. 503-200.000.

Fudala, Chester: *See*—
McFalls, Bob L.; Myers, Timothy S.; and Fudala, Chester, 4,685,735, Cl. 297-362.000.

Fugner, Armin: *See*—
Walther, Gerhard; Schneider, Claus; Weber, Karl-Heinz; and Fugner, Armin, 4,686,219, Cl. 514-220.000.

Fuji Electric Corporate Research and Development Co., Ltd.: *See*—
Nakazawa, Toshiyuki; and Izumi, Akio, 4,685,808, Cl. 356-416.000.

Fuji Kogyo K.K.: *See*—
Nakajima, Junichi; Nakayama, Kenji; and Takizawa, Takeshi, 4,685,498, Cl. 144-208.00B.

Fuji Photo Film Co., Ltd.: *See*—
Aoki, Kozo; Ono, Michio; Saito, Naoki; and Umemoto, Makoto, 4,686,177, Cl. 430-553.000.
Aonuma, Masashi; Watanabe, Hideomi; Miyoshi, Takahito; and Okita, Tsutomu, 4,686,149, Cl. 428-522.000.
Hayashi, Takayuki; Usami, Toshimasa; and Tanaka, Toshiharu, 4,686,547, Cl. 503-207.000.
Koike, Kazuyuki; Tamagawa, Shigehisa; and Fuchizawa, Tetsuro, 4,686,546, Cl. 503-200.000.
Murayama, Jin; Kondo, Ryuji; Tamayama, Hiroshi; Yano, Takashi; and Shizukuishi, Makoto, 4,686,573, Cl. 358-213.220.
Nakauchi, Kenji, 4,686,351, Cl. 219-216.000.
Ogawa, Tadashi; and Okazaki, Masaki, 4,686,175, Cl. 430-505.000.
Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,686,139, Cl. 428-323.000.
Satoyoshi, Yasuhiko; and Wada, Koji, 4,685,638, Cl. 242-199.000.
Suzuki, Kenji, 4,686,571, Cl. 358-213.000.
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.
Tani, Yoshio; Yabe, Masao; and Naruo, Kyoichi, 4,686,543, Cl. 346-137.000.
Watanabe, Yoshiyuki; and Shibata, Yukio, 4,686,593, Cl. 360-97.000.

Fuji Photo Optical Co., Ltd.: *See*—
Ando, Kunio, 4,685,451, Cl. 128-6.000.

Fuji Systems Corporation: *See*—
Onohara, Masayuki; Kawai, Kenji; Shibata, Masaru; Igarashi, Akira; and Kawaguchi, Nobuhisa, 4,686,124, Cl. 428-35.000.

Fujihara, Shigeru: *See*—
Mure, Hiroshi; Mizoguchi, Ryohei; Yokoi, Shinichi; Fujihara, Shigeru; and Ichikawa, Kaoru, 4,686,687, Cl. 373-22.000.

Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, to Daikin Kogyo Co., Ltd.; and Nippon Telegraph & Telephone Public Corporation. Fluoroalkyl acrylate resist material and process for forming fine resist pattern. 4,686,168, Cl. 430-326.000.

Fujiki, Masao: *See*—
Kunii, Shinpei; and Fujiki, Masao, 4,686,590, Cl. 360-78.000.

Fujikura Ltd.: *See*—
Tominaga, Haruo; Takayama, Teruyuki; Ogura, Yoshio; and Yamaguchi, Tetsuo, 4,686,153, Cl. 428-610.000.

Fujinami, Hiroshi: *See*—
Otsuki, Hiromi; Matsuura, Ryoichi; Fujinami, Hiroshi; Hori, Shinichi; Nomura, Yoshihisa; and Oka, Hiroyuki, 4,685,749, Cl. 303-116.000.

Fujioka, Yoshihide; Harada, Shigeyuki; Ohba, Toshihiro; Kanatani, Yoshiharu; and Uede, Hisashi, to Sharp Kabushiki Kaisha. Thin-film EL display panel drive circuit with voltage compensation. 4,686,426, Cl. 315-169.300.

Fujisaki, Kiyonori; Kobayashi, Toshio; and Kato, Heihachi. Small sized fan motor. 4,686,400, Cl. 310-67.00R.

Fujisawa Pharmaceutical Co., Ltd.: *See*—
Ueda, Ikuo; Shiokawa, Youichi; Kato, Masayuki; Konishi, Nobukiyo; and Akahane, Atsushi, 4,686,227, Cl. 514-292.000.

Fujita, Haruyasu; Ogawa, Masao; and Suzuki, Takahisa, to Honda Giken Kogyo Kabushiki Kaisha. Suspension apparatus of vehicle. 4,685,690, Cl. 280-112.00A.

Fujita, Toshiyuki: *See*—
Kumagai, Yuugo; Moribe, Isamu; Saito, Takayuki; Fujita, Toshiyuki; and Kobayashi, Akihiro, 4,686,166, Cl. 430-109.000.

Fujitsu Limited: *See*—
Ando, Moritoshi, 4,686,565, Cl. 358-101.000.
Kaneko, Yoshiaki; Saito, Toshiyuki; and Okubo, Naofumi, 4,686,494, Cl. 333-137.000.
Okazaki, Niro, 4,686,001, Cl. 156-652.000.

Fujiwara, Akinori: *See*—
Tsuge, Hiroshi; Fujiwara, Akinori; and Yoshitsugu, Noritada, 4,685,741, Cl. 297-467.000.

Fujiwara, Haruyoshi, to Mitsubishi Jukogyo Kabushiki Kaisha. Twin-wire former for papermaking machine. 4,686,004, Cl. 162-300.000.

Fujiwara, Tamio: *See*—
Matsubayashi, Hiroshi; Hirota, Kazumi; Iwamoto, Hisao; Fujiwara, Tamio; Sato, Nobuyuki; and Katsura, Tadahiko, 4,686,152, Cl. 428-607.000.

Fujo Photo Film Co., Ltd.: *See*—
Nakanishi, Haruo; Ohba, Hisao; and Sakaki, Hirokazu, 4,686,021, Cl. 204-129.750.

Fukada, Atsushi: *See*—
Kawazu, Akinobu; Fukada, Atsushi; and Hoshinouchi, Susumu, 4,686,349, Cl. 219-121.00L.

Fukada, Tetsuji: *See*—
Ueshiba, Nozomu; Fukada, Tetsuji; and Ise, Yukihiko, 4,685,767, Cl. 350-255.000.

Fukasawa, Minoru, to Sanyo Electric Co., Ltd. Induction heating apparatus with unsuitable load detecting circuit. 4,686,340, Cl. 219-10.770.

Fukaya, Soshichi: *See*—
Sumii, Yoshiyuki; and Fukaya, Soshichi, 4,686,132, Cl. 428-171.000.

Fukuda, Hiroyuki; Shigeta, Masatomo; Kaji, Hisatsugu; and Saitoh, Kuniyuki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for preparing a carbonaceous five-layer fuel cell electrode substrate with elongated holes for feeding reactant gases. 4,686,072, Cl. 264-29.500.

Fukuma, Tositaka; and Satoh, Masaharu, to Sharp Kabushiki Kaisha. Display drive circuit. 4,685,769, Cl. 350-332.000.

Fuller, Robert R. Wing sail. 4,685,410, Cl. 114-102.000.

Fullilove, Tom P.; and Dahlberg, Frank L., to Fullilove, Tom P. Foot pedal or arm crank driven riding bicycle. 4,685,692, Cl. 280-234.000.

Fulmer, Keith H.; and Baker, Donald J., to Allied Corporation. Accumulator having fluid-lubricating seals. 4,685,491, Cl. 138-31.000.

Furness, John A.; and Haggerty, John, to Butterworth Systems, Inc. Method for clearing settled sludge. 4,685,974, Cl. 134-22.180.

Furnish, Gregory R., to Cincinnati Microwave, Inc. Police radar warning receiver with cantilevered PC board structure. 4,686,499, Cl. 333-230.000.

Furuichi, Katsushi: *See*—
Shimizu, Katsuichi; Sakamaki, Hisashi; Furuichi, Katsushi; and Honma, Toshio, 4,685,796, Cl. 355-14.00R.

Furumura, Akio: *See*—
Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, 4,685,689, Cl. 280-707.000.

Furuse, Akio, to Kabushiki Kaisha Kosumo Keiki. Leakage inspection method with object type compensation. 4,686,638, Cl. 364-558.000.

Furuyama, Tohru; and Ohsawa, Takashi, to Kabushiki Kaisha Toshiba. Memory test circuit. 4,686,456, Cl. 324-73.00R.

Gadelle, Claude: *See*—
Burger, Jacques; Gadelle, Claude; and Salle de Chou, Jacques, 4,685,836, Cl. 405-264.000.

Gailey, Edward D.: *See*—
Hall, William E.; Gailey, Edward D.; and Ovanin, George J., 4,685,687, Cl. 279-119.000.

Gaiser, Robert F.: *See*—
Myers, Lawrence R.; and Gaiser, Robert F., 4,685,299, Cl. 60-547.100.

Gajria, Chandrasen, to Gillette Company, The. Shock resistant ink compositions and writing instruments including the compositions. 4,686,246, Cl. 523-161.000.

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Garman, Joseph M.: *See*—
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Middel, Roelof G.; and Oenema, Rinke, 4,685,422, Cl. 119-14.130.

Gaston, Ronald, to Aunger, Kim Garfield. Affixing means. 4,685,717, Cl. 296-97.00A.

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Pensabene, Saverio F.; West, Jon K.; Leclair, Robert A.; Van Conant, Carl F.; Catotti, Arthur J.; and Fralick, William L., 4,686,013, Cl. 204-2.100.

Gattermeyer-Kapp, Ulrike: *See*—
Kapp, Manfred; Gattermeyer-Kapp, Ulrike; and Harty, Alexander, 4,685,732, Cl. 297-35.000.

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McKay, Scot A., 4,685,649, Cl. 248-594.000.

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Schulenberg, Heinrich; and Wisse, Otto, 4,685,204, Cl. 29-726.000.

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Gehrt, Louis M., to Emerson Electric Co. Switch assembly for electrical machinery. 4,686,401, Cl. 310-68.00E.

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Mundt, Peter; Neuhold, Arnold; and Pohl, Claus, 4,685,785, Cl. 353-120.000.

Geist, Michael: *See*—
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Kaltenthaler, Wolfgang; Kramer, Manfred; and Gelse, Heinz-Dieter, 4,685,653, Cl. 251-63.600.

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Hosking, Michael B., 4,686,608, Cl. 361-428.000.

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Marshall, George C., Jr., 4,685,859, Cl. 414-590.000.
Piesik, Edward T., 4,685,533, Cl. 181-213.000.

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Alexander, George E.; and Wilkinson, Stanley B., 4,686,601, Cl. 361-80.000.
Archer, William R., 4,686,436, Cl. 318-254.000.
Boutni, Omar M., 4,686,256, Cl. 524-318.000.
Boyd, John H., Jr., 4,685,201, Cl. 29-596.000.
Chang, Keh-Minn, 4,685,977, Cl. 148-12.70N.
Howery, Richard W.; Rosenquist, Niles R.; Pyles, Robert A.; and Mulvey, Patrick J., 4,686,277, Cl. 528-493.000.
Klassen, David D.; Moyer, Roy E.; Lastrina, Frank A.; and Tameo, Robert P., 4,685,942, Cl. 55-306.000.
McDaniel, David L.; Granfors, Paul R.; and Hoffman, David M., 4,686,369, Cl. 250-385.000.
McMurray, William, 4,686,618, Cl. 363-58.000.
Morris, Robert A.; and Rajotte, Paul T., 4,686,600, Cl. 361-42.000.
Nelson, Linda H., 4,686,245, Cl. 522-163.000.
Possin, George E., 4,686,553, Cl. 357-23.700.
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Sands, Robert W., 4,686,411, Cl. 313-271.000.

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Ehrlich, Robert M.; and Cox, Raymond E., 4,686,106, Cl. 426-577.000.

General Kinematics Corporation: *See*—
Bond, Robert H.; and Kraus, Richard B., 4,685,504, Cl. 164-203.000.

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Fannin, Wayne V.; and Buchanan, Harry C., Jr., 4,685,545, Cl. 188-299.000.
Kopich, Leonard F., 4,685,531, Cl. 180-300.000.
Longhouse, Richard E.; and Vona, Nick, 4,685,513, Cl. 165-121.000.
Radomski, Thomas A., 4,686,442, Cl. 320-17.000.

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Pichat, Alfred, 4,686,450, Cl. 323-282.000.

Genova, John Frank: *See*—
Schoepflin, Stephen L., 4,685,238, Cl. 42-90.000.

GenRad, Inc.: *See*—
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Maguire, Edward A.; Hartnett, Thomas M.; and Gentilman, Richard L., 4,686,070, Cl. 264-1.200.

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Gjestrum, Einar; Dragsund, Inge; Skog, Just; and Selvag, Svein, 4,686,660, Cl. 367-153.000.

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Assaf, Gad, 4,685,617, Cl. 237-81.000.

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German, Richard W. Pet operable annunciator. 4,686,504, Cl. 340-328.000.

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Abraham, Wolf-Rainer; Stumpf, Burkhard; and Kieslich, Klaus, 4,686,183, Cl. 435-158.000.

Ghaly, Azmy W. Clamping device. 4,685,710, Cl. 292-67.000.

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Priem, Richard J.; Ghassemzadeh, M. Reza; and Griffiths, James C., 4,685,510, Cl. 165-62.000.

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Vermeulen, Leon L.; Ghys, Theofiel H.; De Smedt, Willy P.; Vervloet, Ludovicus H.; and Callant, Paul R., 4,686,170, Cl. 430-244.000.

Gibson, Harry T. Pyrolytic decomposition apparatus. 4,686,008, Cl. 202-118.000.

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Krude, Werner, 4,685,897, Cl. 464-141.000.

Glatthorn, Raymond H., to Westinghouse Electric Corp. Method of inserting a sleeve within a heat exchanger tube. 4,685,186, Cl. 29-157.400.

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Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., 4,686,314, Cl. 585-260.000.

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Glory Kogyo Kabushiki Kaisha: *See*—
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Gonzalez, Sergio, to Kasos N.V. Combined forward and rearward viewing mirror assembly for automotive vehicles. 4,685,779, Cl. 350-604.000.

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Gorgon, Georg, to Karl Suss KG, Prazisionsgerate fur Wissenschaft und Industrie GmbH & Co. Device for the automatic focussing of optical instruments with complementary measuring and detecting diaphragms. 4,686,360, Cl. 250-201.000.

Goring, Cleve A. I.: *See*—
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Gorishnyakov, Alexei I.: *See—*
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Goto, Masuo: *See—*
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Goto, Sohei: *See—*
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Gounder, Raj N.: *See—*
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Gozzo, Franco: *See—*
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Graco, Inc.: *See—*
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Rorden, William L., 4,686,689, Cl. 375-81.000.
Graham, Robert. Tone arm assembly. 4,686,664, Cl. 369-55.000.
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Grant, Edward D., Jr.: *See—*
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Gray, Richard L.: *See—*
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Greanias, Evon C.; Guarnieri, C. Richard; Seeland, John J., Jr.; Verrier, Guy F.; and Donaldson, Robert L., to International Business Machines Corporation. Combined finger touch and stylus detection system for use on the viewing surface of a visual display device. 4,686,332, Cl. 178-19.000.
Greaves, Alan J.; and Hunter, Phillip J., to British Telecommunications public limited company. Active filter having series resonant active filter terminated by parallel resonant active filter. 4,686,486, Cl. 330-107.000.
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Green Cross Corporation, The: *See—*
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Greenwalt, Tibor J.; and Coe, Norman A., to University of Cincinnati. Device and method for preventing transfusion of incompatible blood. 4,685,314, Cl. 70-57.000.
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GTE Service Corporation: *See—*
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Gullett, Bradley T. Weed trimmer. 4,685,279, Cl. 56-12.700.
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Haefner, LeRoy H.; and Rhodes, Stephen M., to Macklanburg-Duncan Company. Spirit level. 4,685,219, Cl. 33-379.000.
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Hagerman, Gene R.; Atkins, John W.; and McMurtry, John G., to Sport Cord, Inc. Multi-purpose exerciser. 4,685,671, Cl. 272-139.000.
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Hahn, Gary S., to Immunetech, Inc. Immunotherapeutic polypeptide agents which block immune complex binding to immunoglobulin Fc receptors. 4,686,282, Cl. 530-327.000.

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Hall, Robert L.; Franckx, Joris R. I.; Overbergh, Noel M. M.; Doucet, Jos; and Vansant, Jan, to Raychem Corporation. Flexible envelope seal and sealing method. 4,685,683, Cl. 277-1.000.

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Halliwell, Michael J.; and Zahavi, Joseph. Selective electroless plating. 4,686,114, Cl. 427-53.100.

Hama, Tomio, to Kabushiki Kaisha Harmo. Plastic-mold cutting apparatus using supersonic waves. 4,685,602, Cl. 225-93.000.

Hamada, Masa: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Ishiki, Kunio, 4,686,308, Cl. 564-219.000.

Hamashima, Yoichi: *See—*
Kodama, Kenichi; Tanimoto, Akikazu; Izawa, Hisao; Hamashima, Yoichi; and Hazama, Junji, 4,685,805, Cl. 356-373.000.

Hammond, Albert J., to Ferro Manufacturing Corporation. Window regulator mechanism with rack supporting track of rectangular channel shape. 4,685,248, Cl. 49-352.000.

Hammond, Milton L.: *See—*
Chang, Michael N.; Jensen, Norman P.; Hammond, Milton L.; Zambias, Robert A.; McDonald, John; and Rupprecht, Kathleen M., 4,686,235, Cl. 514-520.000.

Hampton, Thomas C.: *See—*
Dietlein, John E.; and Hampton, Thomas C., 4,686,244, Cl. 523-179.000.

Hanai, Kazuko: *See—*
Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,686,139, Cl. 428-323.000.

Hanemaayer, Jacobus N., to Hanmar Home Equipment Limited. Convertible sitting-sleeping arrangement for recreational vehicle. 4,685,719, Cl. 296-156.000.

Hanke, Reinhart: *See—*
Cvitas, Vilim; Faltejsek, Karl; Hanke, Reinhart; Janusch, Alois; and Larch, Gerhard, 4,685,899, Cl. 494-44.000.

Hanmar Home Equipment Limited: *See—*
Hanemaayer, Jacobus N., 4,685,719, Cl. 296-156.000.

Hanna-Beric Systems, Inc.: *See—*
Steen, Wayne R.; and Aitken, William J., 4,685,841, Cl. 406-84.000.

Hanna, Nabil: *See—*
Bender, Paul E.; Griswold, Don E.; Hanna, Nabil; and Sarau, Henry M., 4,686,231, Cl. 514-333.000.

Hanning, Walter, to C.A. Weidmuller GmbH & Co. Electrical connector arrangement with a short-circuit bridge. 4,685,887, Cl. 439-188.000.

Hansen, Eckhard: *See—*
Machate, Rainer; Vonhausen, Robert; and Hansen, Eckhard, 4,685,733, Cl. 297-284.000.

Hanson, Robert K.; Loeffler, Herbert H.; and Mattera, Philip J., to Hanson Technology Corp. Machine for making sandwiches. 4,685,387, Cl. 99-450.400.

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Hanson, Robert K.; Loeffler, Herbert H.; and Mattera, Philip J., 4,685,387, Cl. 99-450.400.

Hara, Akira; Miyake, Masaya; and Yazu, Shuji, to Sumitomo Electric Industries, Ltd. Composite compact having a base of a hard-centered alloy in which the base is joined to a substrate through a joint layer and process for producing the same. 4,686,080, Cl. 419-8.000.

Hara, Elmer H.: *See—*
MacDonald, Robert I.; Hara, Elmer H.; and Poirier, Arthur L., 4,686,533, Cl. 342-373.000.

Hara, Kenji; Takahashi, Hiromichi; Kamiya, Tetsuro; and Tsujii, Kaoru, to Kao Corporation. Medical composition for external application. 4,686,211, Cl. 514-148.000.

Hara, Kunitaka, to Honda Giken Kogyo Kabushiki Kaisha. Side cover structure for motorcycles. 4,685,530, Cl. 180-219.000.

Harada, Masaru, to Kabushiki Kaisha Kibun. Food extruding apparatus. 4,685,877, Cl. 425-190.000.

Harada, Shigeyuki: *See—*
Fujioka, Yoshihide; Harada, Shigeyuki; Ohba, Toshihiro; Kanatani, Yoshiharu; and Uede, Hisashi, 4,686,426, Cl. 315-169.300.

Harada, Tsutomu: *See—*
Yokoi, Masakatsu; and Harada, Tsutomu, 4,686,359, Cl. 250-201.000.

Harada, Yoshihito: *See—*
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Kiuchi, Masayoshi; and Amano, Kenichiro, 4,685,789, Cl. 354-173.110.

Harada, Yoshito: *See—*
Honda, Masaru; Chiba, Takanori; Imokawa, Toshiaki; Harada, Yoshito; and Nagayasu, Katsumi, 4,686,145, Cl. 428-425.900.

Harder, David K.: *See—*
Harder, Kenneth A., deceased; and Harder, Phyllis J., administratrix, 4,685,619, Cl. 239-1.000.

Harder, Kenneth A., deceased; and by Harder, Phyllis J., administratrix, to Harder, Phyllis J.; Harder, David K.; and Westcott, Brenda K. Dump body spreader. 4,685,619, Cl. 239-1.000.

Harder, Phyllis J.: *See—*
Harder, Kenneth A., deceased; and Harder, Phyllis J., administratrix, 4,685,619, Cl. 239-1.000.

Harder, Phyllis J., administratrix: *See—*
Harder, Kenneth A., deceased; and Harder, Phyllis J., administratrix, 4,685,619, Cl. 239-1.000.

Hardin, Michael L. Air baffle for an overland vehicle. 4,685,715, Cl. 296-1.00S.

Hardstone, John D.: *See—*
Campbell, Simon F.; and Hardstone, John D., 4,686,228, Cl. 514-307.000.

Harris Corporation: *See—*
Harvey, Ian E.; Williams, David G.; Fisher, Barbara J.; and Johnson, Timothy J., 4,686,384, Cl. 307-202.100.

Harris, Robert F., to Dow Chemical Company, The. Process for preparing modified poly(alkylene carbonate) polyahls. 4,686,273, Cl. 528-196.000.

Harris, Robert F.; and Prier, Donald G., to Dow Chemical Company, The. Process for preparing modified poly(alkylene carbonate) polyahls. 4,686,274, Cl. 528-196.000.

Harris, Robert M.; and Anderson, Neil G., to FMC Corporation. Submarine weapon dolly with self stowing bands. 4,685,412, Cl. 114-238.000.

Harris, Robert S., to Stant Inc. Vented fuel cap with bump and grade seal. 4,685,584, Cl. 220-204.000.

Harrison, Craig. Mount for pickup trucks. 4,685,646, Cl. 248-225.310.

Hart, Douglas R. S. Diagnostic thermostat. 4,685,615, Cl. 236-94.000.

Hartnett, Thomas M.: *See—*
Maguire, Edward A.; Hartnett, Thomas M.; and Gentilman, Richard L., 4,686,070, Cl. 264-1.200.

Harty, Alexander: *See—*
Kapp, Manfred; Gattermeyer-Kapp, Ulrike; and Harty, Alexander, 4,685,732, Cl. 297-35.000.

Haruta, Kenyu; Wakata, Hitoshi; Sato, Yukio; Nagai, Haruhiko; Nakatani, Hajime; and Kita, Hideki, to Mitsubishi Denki Kabushiki Kaisha. Discharge excitation type short pulse laser device. 4,686,682, Cl. 372-87.000.

Haruta, Masahiro: *See—*
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma. Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.

Harvey Hubbell Incorporated: *See—*
Nuckolls, Joe A.; and Evans, Kerry G., 4,686,424, Cl. 315-86.000.

Harvey, Ian E.; Williams, David G.; Fisher, Barbara J.; and Johnson, Timothy J., to Harris Corporation. Fuse programmable DC level generator. 4,686,384, Cl. 307-202.100.

Harwath, Frank L., to Suntec Industries Incorporated. Gear pump with means for preventing shaft lock-up. 4,685,871, Cl. 418-206.000.

Harwell, William: *See—*
Edelstein, Fred; Haslett, Robert A.; Kosson, Robert L.; and Harwell, William, 4,685,512, Cl. 165-104.140.

Harwood, Leopold A.; Wargo, Robert A.; and Patel, Chandrakant B., to RCA Corporation. Vertical detail information restoration circuit. 4,686,561, Cl. 358-31.000.

Harwood, Leopold A.: *See—*
Balaban, Alvin R.; Patel, Chandrakant B.; Demmer, Walter H.; and Harwood, Leopold A., 4,686,560, Cl. 358-19.000.

Hasbro, Inc.: *See—*
Israel, Cheryl; and Morgan, Melissa M., 4,685,599, Cl. 224-170.000.

Hasegawa, Koichi: *See—*
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.

Hashima, Akio: *See—*
Tomita, Masao; Hashima, Akio; Ohta, Haruo; and Matsuo, Tadaaki, 4,686,583, Cl. 358-336.000.

Hashimoto, Hiromi: *See—*
Morimoto, Hideaki; and Hashimoto, Hiromi, 4,686,675, Cl. 371-8.000.

Hashimoto, Osamu: *See—*
Morita, Masahiko; Hashimoto, Osamu; and Tanaka, Tomoo, 4,686,471, Cl. 324-243.000.

Hashimoto, Tsutomu: *See—*
Tokunaga, Kuniyuki; and Hashimoto, Tsutomu, 4,686,269, Cl. 526-336.000.

Haskell, Jacob D., to Advanced Micro Devices, Inc. Topside sealing of integrated circuit device. 4,686,559, Cl. 357-54.000.

Haslett, Robert A.: *See—*
Edelstein, Fred; Haslett, Robert A.; Kosson, Robert L.; and Harwell, William, 4,685,512, Cl. 165-104.140.

Hasse, Margaret H.; and Steinhardt, Mark J., to Procter & Gamble Company, The. Disposable diaper having density and basis weight profiled absorbent core. 4,685,915, Cl. 604-378.000.

Hatagawa, Toyotsugu: *See—*
Ueda, Shigeki; Hatagawa, Toyotsugu; and Kasai, Isao, 4,686,356, Cl. 219-482.000.

Hatamoto, Toshihiro: *See—*
Maeda, Hirofumi; Nakamura, Kyoichi; and Hatamoto, Toshihiro, 4,686,087, Cl. 422-133.000.

Hatamura, Yotaro; and Ono, Kozo, to Hatamura, Yotaro; and Hitachi Construction Machinery Co., Ltd. Fine positioning device. 4,686,440, Cl. 318-646.000.

Hatten, James L., to Texas Eastern Drilling Systems, Inc. Stabilizer mechanism for use in drilling deviated well bores. 4,685,895, Cl. 464-19.000.

Haugen, Richard D., to Honeywell Inc. Pneumatic devices with noise dampening. 4,685,485, Cl. 137-85.000.

Hauni-Werke Korber & Co. KG: *See*—
Hagemann, Fritz; and Hagenah, Klaus, 4,685,476, Cl. 131-110.000.

Haupt, Werner, to Otto Bock Orthopaedische Industrie Besitz- und Verwaltungs-Kommanditgesellschaft. Arrestable knee joint. 4,685,926, Cl. 623-43.000.

Haupt, Werner, to Ott Bock Orthopaedische Industrie Besitz- und Verwaltungs-Komanditgesellschaft. Braked knee joint. 4,685,927, Cl. 623-44.000.

Havel, Karel. Multicolor display device. 4,686,425, Cl. 315-152.000.

Havens, Marvin R., to W. R. Grace & Co., Cryovac Div. Vinylidene chloride composition and film made therefrom. 4,686,148, Cl. 428-520.000.

Hawk, Woodrow D.: *See*—
Dixon, Glenn A.; McCloskey, Clark E.; Chambers, David L.; Hawk, Woodrow D.; and McCracken, Oliver W., 4,685,522, Cl. 166-372.000.

Hawks, Mark W.: *See*—
Dykstra, Ronald A.; Hawks, Mark W.; and De Jong, Jerry M., 4,686,609, Cl. 362-61.000.

Hayakawa, Masaharu: *See*—
Kojima, Masanori; and Hayakawa, Masaharu, 4,686,584, Cl. 360-10.300.

Hayashi, Hiroshi: *See*—
Yano, Seiki; Yamamoto, Saburo; Hayashi, Hiroshi; and Morimoto, Taiji, 4,686,679, Cl. 372-48.000.

Hayashi, Hitoshi: *See*—
Isshiki, Isao; and Hayashi, Hitoshi, 4,685,753, Cl. 439-74.000.

Hayashi, Kazunori: *See*—
Enjo, Naonori; Shinjo, Masayoshi; Okazaki, Yasuko; and Hayashi, Kazunori, 4,685,967, Cl. 106-13.000.

Hayashi, Masaaki: *See*—
Suzuki, Mikio; Iwashita, Shigeo; and Hayashi, Masaaki, 4,685,528, Cl. 180-79.100.

Hayashi, Takayuki; Usami, Toshimasa; and Tanaka, Toshiharu, to Fuji Photo Film Co., Ltd. Heat-sensitive recording material. 4,686,547, Cl. 503-207.000.

Hayes Microcomputer Products, Inc.: *See*—
Cressey, John R., 4,686,490, Cl. 332-1.000.

Hayes, William K.: *See*—
Rubin, Richard H.; Hillman, Gary; Zarr, Lewis E.; and Hayes, William K., 4,685,852, Cl. 414-404.000.

Hazama, Junji: *See*—
Kodama, Kenichi; Tanimoto, Akikazu; Izawa, Hisao; Hamashima, Yoichi; and Hazama, Junji, 4,685,805, Cl. 356-373.000.

Heare, Nicole G. Insect protective garment. 4,685,152, Cl. 2-4.000.

Heath, Barbara A. Self-aligned contact process. 4,686,000, Cl. 156-643.000.

Heerdt, Lutz-Peter: *See*—
Beyer, Rudolf; Heerdt, Lutz-Peter; and Schemel, Roland, 4,685,251, Cl. 51-166.00T.

Heesch, Max O.; and Russo, Vincent, to ITT Corporation. Retractable console for an automotive vehicle seat. 4,685,729, Cl. 297-193.000.

Heffner, Robert E.: *See*—
LaBarge, Robert L.; and Heffner, Robert E., 4,685,849, Cl. 413-22.000.

Heidelberg, Gotz; Grundl, Andreas; and Rosner, Peter. Electromagnetic linear drive. 4,686,435, Cl. 318-135.000.

Heiman, Melvin. Adjustably weighted racquet. 4,685,675, Cl. 273-73.00C.

Heitz, Walter: *See*—
Binsack, Rudolf; Kohler, Karl-Heinz; Grigo, Ulrich; Morbitzer, Leo; Bottenbruch, Ludwig; and Heitz, Walter, 4,686,262, Cl. 525-177.000.

Held, Charles F.: *See*—
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.

Held, Kurt. Method of the electrodeposition of a coating on an endless belt. 4,686,016, Cl. 204-25.000.

Helfrich, Robert H. Seating apparatus. 4,685,725, Cl. 297-45.000.

Heller, Harold H.; Oliver, Stephen N.; Whittal, John; Johncock, William; Darcy, Paul J.; and Trundle, Clive, to Plessey Company P.L.C., The. Polychromic tetracyclo-spiro-adamatylidene derivatives, and polychromic lens incorporating said compounds. 4,685,783, Cl. 351-163.000.

Helmut Hund K.G.: *See*—
Herr, Klaus-Dieter, 4,686,598, Cl. 361-31.000.

Henderson, Michael L.; and Owen, Ralph B., to Boeing Company, The. Nacelle/wing assembly with vortex control device. 4,685,643, Cl. 244-199.000.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Erwied, Werner; Upadek, Horst; and Wegemund, Bernd, 4,686,255, Cl. 524-104.000.
Geke, Juergen; and Penninger, Josef, 4,686,084, Cl. 422-17.000.
Schieferstein, Ludwig; Hollenberg, Detlef; and Maak, Norbert, 4,685,931, Cl. 8-406.000.

Hensler, Adolf, to Koflach Sportgerate Gesellschaft. Ski boot. 4,685,225, Cl. 36-117.000.

Hepp, Wolfgang: *See*—
Forssmann, Bernd; Hepp, Wolfgang; Ackern, Klaus; and Chaussy, Christian, 4,685,461, Cl. 128-328.000.

Hercules Incorporated: *See*—
Fifield, Charles C.; Mayes, Richard T.; Tate, Marilyn; and Varnell, Daniel F., 4,686,171, Cl. 430-273.000.

Herd, David P., to Smith International, Inc. Pressure-balanced gate for split-gate valve. 4,685,655, Cl. 251-282.000.

Herion-Werke KG: *See*—
Ruchser, Erich, 4,685,383, Cl. 92-88.000.

Herloski, Robert P.: *See*—
Yip, Kwok-Leung; Antos, Ronald L.; and Herloski, Robert P., 4,686,542, Cl. 346-108.000.

Herman Miller, Inc.: *See*—
Kelley, James O., 4,685,255, Cl. 52-36.000.

Hernandez, Irene H.; Himelstein, Carol S.; and Wang, John S., to International Business Machines Corporation. Method of editing graphic objects in an interactive draw graphic system using implicit editing actions. 4,686,522, Cl. 340-709.000.

Herr, Klaus-Dieter, to Helmut Hund K.G. Safety circuit for vehicle electromotive window lifts. 4,686,598, Cl. 361-31.000.

Herrmann, Gunter; Lohr, Hans-Gunter; and Mozzi, Josef W., to Lohr & Herrmann GmbH. Process and apparatus for peeling a protective film from an exposed photoresist coating on a printed circuit board. 4,685,991, Cl. 156-344.000.

Herron, Susan L., to Schlumberger Technology Corporation. In situ determination of total carbon and evaluation of source rock therefrom. 4,686,364, Cl. 250-256.000.

Hesse, Ronald F., Jr. Pivoting gate unloader. 4,685,856, Cl. 414-515.000.

Hetzer, Frederick C.; and Miller, Guy W., to United Technologies Corporation. Method of disassembly for a gas turbine engine. 4,685,286, Cl. 60-39.020.

Hewlett-Packard Company: *See*—
Banno, Takuo, 4,686,457, Cl. 324-77.00R.
Burgess, Ken L., 4,686,331, Cl. 178-19.000.
Palmer, Donald J., 4,685,968, Cl. 106-23.000.

Hibiya, Taketoshi: *See*—
Ohta, Yoshinori; Sakuma, Isamu; Hibiya, Taketoshi; and Sakaguchi, Mitsuhito, 4,686,678, Cl. 372-33.000.

Hickernell, Fred S.: *See*—
Cho, Frederick Y.; and Hickernell, Fred S., 4,686,111, Cl. 427-38.000.

Hicks, Harry H.; and Davenport, Gerald E. Window guard latch with emergency release. 4,685,316, Cl. 70-256.000.

Hidaka, Kazutaka; and Sawada, Hisashi, to Kabushiki Kaisha Toshiba. Primary radiator for circularly polarized wave. 4,686,537, Cl. 343-786.000.

Higgins, Larry; and Wells, Thomas J., to Leggett & Platt, Incorporated. Box spring having improved coil spring modules. 4,685,162, Cl. 5-247.000.

Hight, Margaret A.: *See*—
Huang, Wann-Sheng; and Hight, Margaret A., 4,685,515, Cl. 166-50.000.

Higuchi, Takeru: *See*—
Amidon, Gordon L.; Higuchi, Takeru; and Dressman, Jennifer B., 4,685,918, Cl. 604-892.000.

Higurashi, Mizuho: *See*—
Nomura, Hirokazu; Sato, Yukihiko; Nishi, Yasuhiko; Higurashi, Mizuho; and Mori, Saburo, 4,686,341, Cl. 219-54.000.

Hilfiker, Peter, to Sprecher & Schuh AG. Motor protection switch. 4,686,599, Cl. 361-32.000.

Hill, Lance E.: *See*—
Sheppard, Douglas B.; Solbes, Albert; Stansel, John C.; and Hill, Lance E., 4,685,404, Cl. 110-265.000.

Hille, Martin: *See*—
Hofinger, Manfred; Hille, Martin; and Bohm, Roland, 4,686,066, Cl. 252-344.000.

Hillman, Gary: *See*—
Rubin, Richard H.; Hillman, Gary; Zarr, Lewis E.; and Hayes, William K., 4,685,852, Cl. 414-404.000.

Hills, Ivan E.; and Holmelund, George, to Hacker Instruments, Inc. Blade-holder magazine. 4,685,564, Cl. 206-354.000.

Himelstein, Carol S.: *See*—
Hernandez, Irene H.; Himelstein, Carol S.; and Wang, John S., 4,686,522, Cl. 340-709.000.

Hinman, Edmund R., to Ex-Cell-O Corporation. Method of electrochemical machining bladed rotors. 4,686,020, Cl. 204-129.100.

Hipp, Betsy; Saltzman, Jeremy; and Dwyer, John J., to Dictaphone Corporation. Record and/or playback device with cue signal indication and access. 4,686,587, Cl. 360-74.200.

Hirakawa, Hiromasa: *See*—
Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, 4,686,079, Cl. 376-444.000.

Hiramatsu, Toshiyuki: *See*—
Azuma, Shizuo; Hiramatsu, Toshiyuki; Nakagawa, Koji; and Ichikawa, Yataro, 4,685,952, Cl. 71-86.000.

Hirano, Shinichi, to Hirano, Shinichi; and Seiko Instruments & Electronics Ltd. Process for manufacturing calcium carbonate single crystal. 4,685,995, Cl. 156-623.00R.

Hirao, Katsumi; and Miyake, Toshio, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo; and Kanpe Katei Toryoo Kabushiki Kaisha. Aerosol container and process for manufacturing same. 4,685,597, Cl. 222-389.000.

Hiraoka & Co., Ltd.: *See*—
Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, 4,686,135, Cl. 428-265.000.

Hiraoka, Yoshiji: *See*—
Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, 4,686,135, Cl. 428-265.000.

Hirasawa, Ronald T. Promotional article. 4,685,699, Cl. 281-15.00R.

Hirose, Mitsumasa: *See*—
Yagishita, Koichi; Iriyama, Yasunori; and Hirose, Mitsumasa, 4,686,043, Cl. 210-387.000.

Hirose, Ryusho, to Canon Kabushiki Kaisha. Reflection and refraction optical system. 4,685,777, Cl. 350-505.000.

Hiroshima, Kazuo: *See*—
Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, 4,685,689, Cl. 280-707.000.

Hirota, Kazumi: *See*—
Matsubayashi, Hiroshi; Hirota, Kazumi; Iwamoto, Hisao; Fujiwara, Tamio; Sato, Nobuyuki; and Katsura, Tadahiko, 4,686,152, Cl. 428-607.000.

Hirota, Kazuo: *See*—
Shimohira, Shigeru; Kimoto, Yasuyuki; and Hirota, Kazuo, 4,685,622, Cl. 239-346.000.

Hisamatsu, Kenichi: *See*—
Nishi, Toshiro; Murakami, Nobuaki; Ueda, Kenji; Shirakawa, Seiichi; Notomi, Akira; Hisamatsu, Kenichi; and Kaneko, Shozo, 4,686,158, Cl. 429-26.000.

Hitachi Cable Ltd.: *See*—
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, 4,686,328, Cl. 174-153.00R.

Hitachi Chemical Co.: *See*—
Kumagai, Yuugo; Moribe, Isamu; Saito, Takayuki; Fujita, Toshiyuki; and Kobayashi, Akihiro, 4,686,166, Cl. 430-109.000.

Hitachi Construction Machinery Co., Ltd.: *See*—
Hatamura, Yotaro; and Ono, Kozo, 4,686,440, Cl. 318-646.000.

Hitachi Electronics Engineering Co. Ltd.: *See*—
Saito, Susumu; Suzuki, Michio; Suda, Kyo; Yatsugake, Yasuo; and Tsukada, Kazuya, 4,685,802, Cl. 356-339.000.

Hitachi Engineering Co., Ltd.: *See*—
Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, 4,686,079, Cl. 376-444.000.

Hitachi, Ltd.: *See*—
Hori, Ryoichi; and Ito, Kiyoo, 4,686,650, Cl. 365-189.000.
Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, 4,686,079, Cl. 376-444.000.
Matsuyama, Haruhiko; Shoji, Fusaji; and Kuwazuka, Shunichiro, 4,686,147, Cl. 428-447.000.
Saito, Susumu; Suzuki, Michio; Suda, Kyo; Yatsugake, Yasuo; and Tsukada, Kazuya, 4,685,802, Cl. 356-339.000.
Sato, Kazuo; Shiohata, Kouki; Matsushita, Osami; Kikuchi, Katsuaki; Takasumi, Masakazu; Sato, Ichiya; and Kaneko, Ryoichi, 4,685,335, Cl. 73-660.000.
Yamada, Minoru; Usui, Mitsuru; Masaki, Akira; Nakanishi, Keiichirou; and Tokuda, Masahide, 4,686,606, Cl. 361-385.000.

Hitachi Metals, Ltd.: *See*—
Arakawa, Shunsuke; and Shitori, Kunio, 4,686,347, Cl. 219-117.100.

Hitchcock, David C.: *See*—
Lisowyj, Bohdan; and Hitchcock, David C., 4,686,031, Cl. 209-2.000.

Hoag, Ethan; and Zeiders, Glenn, to Laser Corporation of America. Gas laser having improved crossflow blower arrangement. 4,686,680, Cl. 372-58.000.

Hoag, Ethan D., to Laser Corporation of America. Gas laser having thermally stable optical mount. 4,686,685, Cl. 372-107.000.

Hobbins, Martin E.: *See*—
Dickie, Robert G.; and Hobbins, Martin E., 4,686,576, Cl. 358-245.000.

Hobson, Willis S., to Seymour Mfg. Co. Three axis corner bracket. 4,685,576, Cl. 211-189.000.

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Horoldt, Ernst; and Urschel, Adam, 4,686,097, Cl. 423-520.000.
Hunger, Klaus, 4,686,287, Cl. 534-742.000.
Keil, Karl-Heinz; Wullbrandt, Dieter; Keller, Reinhold; and Engelhardt, Friedrich, 4,686,243, Cl. 521-149.000.
Papenfuhs, Theodor; and Schophoff, Friedrich, 4,686,301, Cl. 549-427.000.

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Hoelzel, Eva G.: *See*—
Gliemeroth, Georg; Ross, Ludwig; Eichhorn, Uwe; Hoelzel, Eva G.; and Speit, Burkhard, 4,686,196, Cl. 501-13.000.

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Huebner, Horst; Tauber, Guenter; Hofbauer, Peter; Glatzer, Roland; Beintze, Guenther; Wagner, Dieter; and Riege, Guenter, 4,685,328, Cl. 73-55.000.

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McDaniel, David L.; Granfors, Paul R.; and Hoffman, David M., 4,686,369, Cl. 250-385.000.

Hoffman, Dorothy M., to RCA Corporation. Deposition of silicon dioxide. 4,686,112, Cl. 427-42.000.

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Nickell, Louis G.; Stach, Leonard J.; and Hokama, Takeo, 4,685,960, Cl. 71-94.000.

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Eberhart, Laurence L.; and Holben, Larry B., 4,685,259, Cl. 52-144.000.

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Schieferstein, Ludwig; Hollenberg, Detlef; and Maak, Norbert, 4,685,931, Cl. 8-406.000.

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Plater, Michael G.; Middleton, Kenneth; and Jackson, David B., 4,685,839, Cl. 405-288.000.

Holm, Lauri J., to Systemteknik AB. Arrangement in a load cell. 4,685,526, Cl. 177-211.000.

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Hills, Ivan E.; and Holmelund, George, 4,685,564, Cl. 206-354.000.

Holmes, Mark A.: *See*—
Honard, Mark R.; Holmes, Mark A.; and Jarrett, Robert D., 4,685,900, Cl. 604-5.000.

Holstedt, Richard A.: *See*—
Jessup, Peter; Holstedt, Richard A.; and Baron, Kenneth, 4,686,056, Cl. 252-49.700.

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Holtman, Dennis C., to Personal Products Company. Disposable urinary pad. 4,685,914, Cl. 604-368.000.

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Morishima, Kazuo, 4,686,656, Cl. 362-72.000.

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Fujita, Haruyasu; Ogawa, Masao; and Suzuki, Takahisa, 4,685,690, Cl. 280-112.00A.
Hara, Kunitaka, 4,685,530, Cl. 180-219.000.
Inagaki, Takashi; Shimada, Toshio; and Yoshimoto, Tokuji, 4,685,428, Cl. 123-52.00A.
Kouyama, Mikihiro, 4,685,694, Cl. 280-270.000.
Niwa, Toshiaki, 4,685,724, Cl. 296-216.000.
Shimizu, Yasuo, 4,686,433, Cl. 318-50.000.

Honda, Keisuke: *See*—
Yamamoto, Shigeo, 4,686,659, Cl. 367-87.000.

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Nara, Kiyoshi; and Honda, Susumu, 4,686,284, Cl. 530-351.000.

Honey, Stanley K.: *See*—
Buxton, James L.; Phillips, Alan C.; and Honey, Stanley K., 4,686,642, Cl. 364-607.000.

Honeywell Inc.: *See*—
Donovan, William J.; and Sanford, George G., 4,686,627, Cl. 364-481.000.
Haugen, Richard D., 4,685,485, Cl. 137-85.000.
Levine, Michael R., 4,685,614, Cl. 236-78.00D.
Simison, Paul C., 4,686,640, Cl. 364-571.000.

Honeywell Information Systems Inc.: *See*—
Keeley, James W.; Ledoux, Robert V.; and Negi, Virendra S., 4,686,621, Cl. 364-200.000.

Honma, Toshio: *See*—
Shimizu, Katsuichi; Sakamaki, Hisashi; Furuichi, Katsushi; and Honma, Toshio, 4,685,796, Cl. 355-14.00R.

Hood, Delos W.: *See*—
Manning, Donald L.; and Hood, Delos W., 4,685,858, Cl. 414-537.000.

Hoover, Lonnie D.: *See*—
House, Roy F.; and Hoover, Lonnie D., 4,686,051, Cl. 252-8.551.

Hoppie, Lyle O.: *See*—
Schachameyer, Steven R.; Benjamin, James A.; Pardee, John B.; and Hoppie, Lyle O., 4,685,976, Cl. 437-173.000.

Hori, Makoto: *See*—
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.

Hori, Ryoichi; and Ito, Kiyoo, to Hitachi, Ltd. Monolithic storage device. 4,686,650, Cl. 365-189.000.

Hori, Saburo; and Watanabe, Nobuhiro, to Kureha Chemical Industry Co., Ltd. Composite abrasive particles for magnetic abrasive polishing and process for preparing the same. 4,685,937, Cl. 51-309.000.

Hori, Shinichi: *See*—
Otsuki, Hiromi; Matsuura, Ryoichi; Fujinami, Hiroshi; Hori, Shinichi; Nomura, Yoshihisa; and Oka, Hiroyuki, 4,685,749, Cl. 303-116.000.

Horn, Manfred; and Mayer, Franz, to Gebr. Bode & Co. GmbH. Helical ball gearing. 4,685,344, Cl. 74-424.8NA.

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Hosel, Peter: *See*—
Klobenzer, Heinz; and Hosel, Peter, 4,686,049, Cl. 210-774.000.

Hoshinouchi, Susumu: *See*—
Kawazu, Akinobu; Fukada, Atsushi; and Hoshinouchi, Susumu, 4,686,349, Cl. 219-121.00L.

Hosiden Electronics Co., Ltd.: *See*—
Yoshida, Noboru, 4,685,758, Cl. 439-606.000.

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Masuda, Toru; and Shibano, Yasuji, 4,685,212, Cl. 29-876.000.

Hosking, Michael B., to General Dynamics, Electronics Division. Electronic equipment rack interconnection system. 4,686,608, Cl. 361-428.000.

Hoss, Donald A., to Chrysler Motors Corporation. Shipping unit. 4,685,571, Cl. 206-583.000.

Hotta, Toshinori. Synchronizing burst transmission phase control system. 4,686,673, Cl. 370-104.000.

Houck, Glenn M.: *See*—
Houck, Jasper C., Jr., 4,685,222, Cl. 34-229.000.

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House Food Industrial Company Limited: *See*—
Sakuichi, Sakakibara; Yoshiaki, Tokuda; Tamio, Nagai; Yorinobu, Takino; and Tomiro, Arai, 4,685,810, Cl. 366-150.000.

House, Roy F.; and Hoover, Lonnie D., to NL Industries, Inc. Method of increasing the rate of hydration of activated hydroxyethyl cellulose compositions. 4,686,051, Cl. 252-8.551.

Howard, H. Taylor, to Chaparral Communications. Dual probe signal receiver. 4,686,491, Cl. 333-21.00A.

Howell, Dan M.: *See*—
Rush, Elizabeth A.; Howell, Dan M.; and Kolpek, Robert A., 4,686,649, Cl. 364-900.000.

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Howery, Richard W.; Rosenquist, Niles R.; Pyles, Robert A.; and Mulvey, Patrick J., to General Electric Company. Process for separating and polymerizing cyclic oligomeric polycarbonate. 4,686,277, Cl. 528-493.000.

Howkins, Stuart D.: *See*—
Schmidle, Lisa M.; and Howkins, Stuart D., 4,686,539, Cl. 346-1.100.

Howland, Leland L.; and Seshadri, Jayaram, to Westinghouse Electric Corp. Compartmentalized transport refrigeration system. 4,685,306, Cl. 62-117.000.

Hoyt, John M.; and Blazey, Steven D., to National Distillers and Chemical Corporation. Partially hydrolyzed ethylene-vinyl acetate (EVA) elastomers vulcanizable with sulfur. 4,686,264, Cl. 525-330.400.

Hsei, Paul K.: *See*—
Meguro, Jun-Ichi; Solberg, Arne L.; Stark, William A.; and Hsei, Paul K., 4,685,880, Cl. 425-416.000.

HTC Corporation, The: *See*—
Spigarelli, Donald J.; Peck, Douglas J.; and Finney, James L., 4,685,605, Cl. 228-37.000.

Hu, Liang-Tung. Flow regulator for drip infusion. 4,685,654, Cl. 251-205.000.

Huang, Wann-Sheng; and Hight, Margaret A., to Texaco Inc. Modified 7 spot patterns of horizontal and vertical wells for improving oil recovery efficiency. 4,685,515, Cl. 166-50.000.

Hubbell Incorporated: *See*—
Boteler, William C.; and Ehrenfels, Alfred L., 4,686,381, Cl. 307-147.000.

Huber, Daniel J.: *See*—
Flaherty, Kenneth A.; Huber, Daniel J.; and Lewis, Robert T., 4,685,993, Cl. 156-475.000.

Hubert, James F.: *See*—
Hupfer, Bruce A.; and Hubert, James F., 4,686,144, Cl. 428-421.000.

Hucul, Dennis A.: *See*—
Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., 4,686,314, Cl. 585-260.000.

Hudler, Dennis W.: *See*—
Oswald, Norman D.; Mankey, Harry S.; Dean, Robert R.; and Hudler, Dennis W., 4,685,527, Cl. 180-14.300.

Hudson, J. Albert: *See*—
Lewis, Robert L., Jr.; and Hudson, J. Albert, 4,685,586, Cl. 220-305.000.

Huebner, Horst; Tauber, Guenter; Hofbauer, Peter; Glatzer, Roland; Beintze, Guenther; Wagner, Dieter; and Riege, Guenter, to Schott Gerate GmbH. Capillary viscometer. 4,685,328, Cl. 73-55.000.

Huetsch, Larry, to Madock, Michael. Continuous shaft-driven industrial robot. 4,685,861, Cl. 414-729.000.

Huff, Joel R.; Baldwin, John J.; Sakurai, Yojiro; Vacca, Joseph P.; and Guare, James P., Jr., to Merck & Co., Inc. Substituted benzo[b]furo- and benzo[b]thieno quinolizines. 4,686,226, Cl. 514-285.000.

Hugg, Clifford R. Retractable swivel stud. 4,685,237, Cl. 42-85.000.

Hughes Aircraft Company: *See*—
Beyerbach, Daniel M.; Scott, William L.; and Goczalk, Robert W., 4,686,458, Cl. 324-83.00D.
Chang, Donald C. D.; and Wong, Mon N., 4,686,493, Cl. 333-113.000.
Fossum, Eric R., 4,686,648, Cl. 364-862.000.
McKenna, Charles M.; Sharapata, Irwin R.; and Clark, William M., Jr., 4,686,414, Cl. 313-362.100.
Paranto, Joseph N.; Wang, John H. S.; and Williams, Larry, 4,686,681, Cl. 372-82.000.
Soffer, Bernard H.; Efron, Uzi; and Marom, Emanuel, 4,686,647, Cl. 364-850.000.

Hughes, David T.: *See*—
Worns, John R.; Farber, Milton; and Hughes, David T., 4,686,172, Cl. 430-286.000.

Hughes Tool Company-USA: *See*—
Worthen, Steven J.; and Oursler, James D., 4,685,359, Cl. 76-108.00A.

Hull, Jack W. Portable yard sign. 4,685,233, Cl. 40-607.000.

Humber, Leslie G.: *See*—
Ferdinandi, Eckhardt S.; Mobilio, Dominick; Sabatucci, Joseph P.; and Humber, Leslie G., 4,686,213, Cl. 514-161.000.

Humes Limited: *See*—
Lee, Kevin J.; and Carty, Noel C., 4,685,656, Cl. 256-13.100.

Humphrey, Floyd B., to Sensormatic Electronics Corporation. Method, system and apparatus for use in article surveillance. 4,686,516, Cl. 340-572.000.

Hunger, Klaus, to Hoechst Aktiengesellschaft. Disazo compounds derived from acetoacetylamino-benzimidazol-2-ones. 4,686,287, Cl. 534-742.000.

Hunter Douglas, Inc.: *See*—
Anderson, Richard N., 4,685,986, Cl. 156-197.000.

Hunter Douglas International N.V.: *See*—
Spangenberg, Robbert E., 4,685,502, Cl. 160-107.000.

Hunter, Phillip J.: *See*—
Greaves, Alan J.; and Hunter, Phillip J., 4,686,486, Cl. 330-107.000.

Huntington Alloys Inc.: *See*—
Smith, John S.; and Smith, Darrell F., Jr., 4,685,978, Cl. 148-142.000.

Hupfer, Bruce A.; and Hubert, James F., to W. H. Brady Co. High performance printable coatings for identification devices. 4,686,144, Cl. 428-421.000.

Hutchings, David A.: *See*—
Willard, G. Fred; Wait, Michael R.; Hutchings, David A.; and Lauderback, Sanford K., 4,685,873, Cl. 264-83.000.

Hutchins, Wayne: *See*—
Bunning, Ernst; and Hutchins, Wayne, 4,685,235, Cl. 42-75.020.

Huttlin, Herbert. Fluidized bed apparatus. 4,685,809, Cl. 366-101.000.

Huynh-Ba, Tuong; and Osman, Maged A., to Merck Patent Gesellschaft mit beschrankter Haftung. Anisotropic compounds and liquid crystal mixtures. 4,686,289, Cl. 544-224.000.

Hyatt, Gilbert P. Computer system architecture using serial communication. 4,686,622, Cl. 364-200.000.

Hyatt, Gilbert P. Filtering system for processing signature signals. 4,686,655, Cl. 367-59.000.

Hydrotreat, Inc.: *See*—
Arnaud, Johnny, 4,686,038, Cl. 210-232.000.

Hydrowatt Systems Ltd.: *See*—
Frey, Bernhard, 4,685,382, Cl. 92-86.500.

Hyodo, Masakatsu; Kusumoto, Koji; and Sokawa, Takuji, to Ashimori Industry Co., Ltd. Tubular lining material for city water pipe lines. 4,686,126, Cl. 428-36.000.

Hystar Aerospace Development Corporation: *See*—
Warrington, John E.; and Kramer, Dale C., 4,685,640, Cl. 244-29.000.

Ichikawa, Kaoru: *See*—
Mure, Hiroshi; Mizoguchi, Ryohei; Yokoi, Shinichi; Fujihara, Shigeru; and Ichikawa, Kaoru, 4,686,687, Cl. 373-22.000.

Ichikawa, Yataro: *See*—
Azuma, Shizuo; Hiramatsu, Toshiyuki; Nakagawa, Koji; and Ichikawa, Yataro, 4,685,952, Cl. 71-86.000.

Ichioka, Youichi, to Mitsubishi Denki Kabushiki Kaisha. Elevator group supervision apparatus. 4,685,536, Cl. 187-101.000.

Ide, Tatsumi; Morimoto, Masayuki; and Chiba, Kei, to NEC Corporation. Electromagnetic relay. 4,686,500, Cl. 335-128.000.

Igarashi, Akira: *See—*
Onohara, Masayuki; Kawai, Kenji; Shibata, Masaru; Igarashi, Akira; and Kawaguchi, Nobuhisa, 4,686,124, Cl. 428-35.000.

Igarashi, Takao: *See—*
Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, 4,686,079, Cl. 376-444.000.

Ihikawa, Junji: *See—*
Sawada, Takamasa; and Ihikawa, Junji, 4,685,793, Cl. 355-3.0SH.

Iida, Katumi, to Diesel Kiki Co., Ltd. Automotive air-conditioning apparatus with demist control. 4,685,508, Cl. 165-17.000.

Iida, Naohiro: *See—*
Kitaya, Katsuhiko; Iida, Naohiro; Miyake, Atsushi; Kobayashi, Mitsuo; and Shirai, Akira, 4,685,180, Cl. 29-33.00R.

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Iinuma, Hironobu: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, 4,686,308, Cl. 564-219.000.

Ikeda, Masami; Shibata, Makoto; Takahashi, Hiroto; and Matsuda, Hiroto, to Canon Kabushiki Kaisha. Liquid jet recording head. 4,686,544, Cl. 346-140.00R.

Illinois Tool Works Inc.: *See—*
Swain, Henry L., 4,685,562, Cl. 206-328.000.

Ilsemann, Heino. Method and apparatus for introducing compact disks into compact disk boxes. 4,685,277, Cl. 53-474.000.

Imai, Chihiro: *See—*
Tachikawa, Mamoru; Sakuma, Masato; Ueki, Satoshi; Imai, Chihiro; and Makishima, Tokuo, 4,686,199, Cl. 502-104.000.

Imai, Kenji: *See—*
Saito, Akinori; Yamada, Masatoshi; Imai, Kenji; Kawamura, Kiyomi; and Kimura, Masanobu, 4,685,432, Cl. 123-276.000.

Imai, Ryuji: *See—*
Sawada, Daisaku; Sugaya, Masami; Soga, Yoshinobu; and Imai, Ryuji, 4,685,357, Cl. 74-867.000

Imakawa, Kazuhiko: *See—*
Crabtree, Paul J.; and Imakawa, Kazuhiko, 4,686,060, Cl. 252-90.000.

Imamura, Akira: *See—*
Goto, Hideo; and Imamura, Akira, 4,686,588, Cl. 360-76.000.

Imanaka, Asaji, to Nippon Air Brake Co., Ltd. Railway vehicle brake system with improved blending control of pneumatic and electric brakes. 4,685,750, Cl. 303-15.000.

Imatani, Tsuneo: *See—*
Matsuno, Kenji; Yasumuro, Hisakazu; Taira, Kazuo; Imatani, Tsuneo; and Toyoshima, Makoto, 4,685,989, Cl. 156-244.130.

Imhof, Robert E.: *See—*
Birch, David J. S.; and Imhof, Robert E., 4,686,371, Cl. 250-461.100.

Immunetech, Inc.: *See—*
Hahn, Gary S., 4,686,282, Cl. 530-327.000.

Imokawa, Toshiaki: *See—*
Honda, Masaru; Chiba, Takanori; Imokawa, Toshiaki; Harada, Yoshito; and Nagayasu, Katsumi, 4,686,145, Cl. 428-425.900.

Imori, Hideo; and Takahara, Toshiyuki, to Mitsubishi Denki Kabushiki Kaisha. Rotor for rotary electrical machines. 4,686,399, Cl. 310-62.000.

Imoto, Masaya: *See—*
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, 4,686,308, Cl. 564-219.000.

Imperial Chemical Industries PLC: *See—*
Birse, Alan D.; and King, Alan G., 4,685,396, Cl. 102-206.000.
King, Alan G., 4,685,395, Cl. 102-202.200.
Padget, John C.; and Forrester, James T., deceased, 4,686,278, Cl. 528-495.000.

Inaba, Naomi: *See—*
Maruyama, Kouji; Nomura, Takeshi; Ueno, Hiroshi; and Inaba, Naomi, 4,686,265, Cl. 526-125.000.

Inagaki, Takashi; Shimada, Toshio; and Yoshimoto, Tokuji, to Honda Giken Kogyo Kabushiki Kaisha. Multi-cylinder internal combustion engine. 4,685,428, Cl. 123-52.00A.

Inco Alloys International, Inc.: *See—*
Tassen, Curtis S.; and Smith, Gaylord D., 4,685,427, Cl. 122-511.000.

Indapp Engineering B.V.: *See—*
Van der Hulst, Herman L.; and Meerman, Arend H., 4,685,713, Cl. 294-90.000.

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Chen, Chang C., 4,685,388, Cl. 99-641.000.
Lee, Ming-Kwang, 4,685,196, Cl. 437-41.000.

Infrarodteknik AB: *See—*
Bjornberg, Thomas, 4,685,762, Cl. 350-1.100.

Innovative Controls, Incorporated: *See—*
Kuhnel, Donald S.; and Ottenstein, Sidney A., 4,686,428, Cl. 315-307.000.

Innovus: *See—*
Renken, Wayne G.; LeMay, Dan B.; and Takahashi, Ricardo M., 4,685,331, Cl. 73-204.000.

Ino, Kazuhide: *See—*
Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, 4,686,135, Cl. 428-265.000.

Inoue-Japax Research Inc: *See—*
Inoue, Kiyoshi, 4,686,343, Cl. 219-69.00W.

Inoue, Kiyoshi, to Inoue-Japax Research Inc. Method of and apparatus for resetting a wire electrode in an operating setup on an electroerosion machine. 4,686,343, Cl. 219-69.00W.

Inoue, Masataka: *See—*
Yanazawa, Tadaaki; Tanaka, Teruaki; Noda, Akio; Takeda, Ryo; and Inoue, Masataka, 4,685,320, Cl. 72-250.000.

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Terano, Minoru; Soga, Hirokazu; Inoue, Masuo; and Miyoshi, Katsuyoshi, 4,686,200, Cl. 502-112.000.

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Insa, Andre: *See—*
Mace, Guy; Anglard, Andre; and Insa, Andre, 4,685,377, Cl. 89-1.540.

Institut Francais du Petrole: *See—*
Baviere, Marc; and Durif Varambon, Bruno, 4,686,053, Cl. 252-8.554.
Burger, Jacques; Gadelle, Claude; and Salle de Chou, Jacques, 4,685,836, Cl. 405-264.000.

Institut Organicheskogo Sinteza Akademii Nauk SSR: *See—*
Kalvinsh, Ivars Y.; and Astapenok, Elena B., 4,686,215, Cl. 514-183.000.

Institut Pasteur: *See—*
Dodin, Andre; Siffert, Odile; Le Thuillier, Georgette; and Allard, Patrice, 4,686,281, Cl. 530-327.000.

Institute Elektrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR: *See—*
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Gorishnyakov, Alexei I.; Bogorsky, Mikhail V.; and Lazebny, Ivan L., 4,686,346, Cl. 219-110.000.

Intecolor Corporation: *See—*
Williamson, Floyd L., 4,686,616, Cl. 363-21.000.

Integrated Technology Work, Inc.: *See—*
Liptak, Frank J., Jr.; and North, Arthur J., 4,686,514, Cl. 340-571.000.

International Business Machines Corporation: *See—*
Asano, Hideo, 4,686,578, Cl. 358-280.000.
Beaven, Paul A.; Canton, Dave A.; Sargeant, Nick B.; and Snagge, Tom H., 4,686,521, Cl. 340-703.000.
Elsasser, Michael; and Stohr, Roland, 4,686,464, Cl. 324-158.00P.
Flint, Ephraim B.; Gruber, Peter A.; Marks, Ronald F.; Olive, Graham; and Zingher, Arthur R., 4,685,606, Cl. 228-123.000.
Greanias, Evon C.; Guarnieri, C. Richard; Seeland, John J., Jr.; Verrier, Guy F.; and Donaldson, Robert L., 4,686,332, Cl. 178-19.000.
Hernandez, Irene H.; Himelstein, Carol S.; and Wang, John S., 4,686,522, Cl. 340-709.000.
Lo, Tin-Chee, 4,686,392, Cl. 307-448.000.
Prilik, Ronald J., 4,686,462, Cl. 324-158.00R.
Rush, Elizabeth A.; Howell, Dan M.; and Kolpek, Robert A., 4,686,649, Cl. 364-900.000.
Wallace, David R., 4,686,623, Cl. 364-300.000.
Wilkie, Bruce J., 4,686,699, Cl. 379-93.000.

International Flavors & Fragrances Inc.: *See—*
Farbood, Mohamad I.; Morris, James A.; and Seitz, Eugene W., 4,686,307, Cl. 560-205.000.
Hall, John B., 4,686,310, Cl. 568-838.000.

International Power Technology: *See—*
Cheng, Dah Y., 4,685,288, Cl. 60-39.550.

InterNorth, Inc.: *See—*
Lisowyj, Bohdan; and Hitchcock, David C., 4,686,031, Cl. 209-2.000.

Inukai, Hiroshi: *See—*
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Iona Appliances Inc.: *See—*
Beaudoin, Laurent, 4,685,171, Cl. 15-391.000.

Iowa State University Research Foundation, Inc.: *See—*
Anderson, Lloyd L., 4,686,103, Cl. 424-97.000.

Irie, Nobuhiko, to Mitsubishi Jukogyo Kabushiki Kaisha. Apparatus for manufacturing a radial tire. 4,685,992, Cl. 156-396.000.

Iriuchijima, Shinobu; Kobayashi, Hirohiko; Aoki, Kyoji; Oda, Takeshi; Shinoyama, Masayuki; and Nosaka, Yoshifumi, to Denki Kagaku Kogyo Kabushiki Kaisha. Process for producing oxiracetam. 4,686,296, Cl. 548-544.000.

Iriyama, Yasunori: *See—*
Yagishita, Koichi; Iriyama, Yasunori; and Hirose, Mitsumasa, 4,686,043, Cl. 210-387.000.

IRSID: *See—*
Sierpinski, Herve ; and Philippe, Jean, 4,685,812, Cl. 374-132.000.

Isabell, James T. Adjustable flex golf club. 4,685,682, Cl. 273-162.00R.

Isaka, Kazuo, to Canon Kabushiki Kaisha. Information processing apparatus used in a magneto-optical information recording-reproducing apparatus and having improved erasing capability. 4,686,661, Cl. 369-13.000.

Ise, Yukihiko: *See—*
Ueshiba, Nozomu; Fukada, Tetsuji; and Ise, Yukihiko, 4,685,767, Cl. 350-255.000.

Iseki & Co. Ltd.: *See—*
Tamura, Kazuhisa; Watanabe, Hideo; and Shimiza, Akihiro, 4,685,529, Cl. 180-89.120.

Iseki, Masahide; Yoshiyama, Toshio; Kajita, Hiroshi; Itakiyo, Masanori; Kusumoto, Hiroshi; Kawamori, Yoshizo; and Kawamoto, Masuo, to

Mita Industrial Co., Ltd. Copying paper feed device for an electrostatic copying apparatus. 4,685,792, Cl. 355-3.0SH.

Ishihara, Shoichi: *See*—
Kono, Masao; Komeno, Taichitro; Ishihara, Shoichi; Yamauchi, Akira; and Okabayashi, Tadashi, 4,686,179, Cl. 435-7.000.

Ishii, Hiromi: *See*—
Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, 4,686,081, Cl. 420-29.000.

Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, to Hitachi, Ltd.; and Hitachi Engineering Co., Ltd. Fuel assembly. 4,686,079, Cl. 376-444.000.

Ishiwata, Junichi. Electronic equipment selectively storing a frequently used conversion function. 4,686,643, Cl. 364-715.000.

Ishiyama, Kazufumi, to Kabushiki Kaisha Toshiba. Curvilinear array of ultrasonic transducers. 4,686,408, Cl. 310-334.000.

Ishizuki, Kenji: *See*—
Iida, Yoshikazu; and Ishizuki, Kenji, 4,685,786, Cl. 354-21.000.

Israel, Cheryl; and Morgan, Melissa M., to Hasbro, Inc. Novelty wristwatch. 4,685,599, Cl. 224-170.000.

Isshiki, Isao; and Hayashi, Hitoshi, to Tokai Electric Wire Company Limited. Interconnection apparatus for wiring harnesses. 4,685,753, Cl. 439-74.000.

Isshiki, Isao; and Takahashi, Shinichiro, to Sumitomo Electric Industries, Ltd. Digital filter circuit. 4,686,483, Cl. 328-165.000.

Isshiki, Kunio: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, 4,686,308, Cl. 564-219.000.

Itakiyo, Masanori: *See*—
Iseki, Masahide; Yoshiyama, Toshio; Kajita, Hiroshi; Itakiyo, Masanori; Kusumoto, Hiroshi; Kawamori, Yoshizo; and Kawamoto, Masuo, 4,685,792, Cl. 355-3.0SH.

Ito, Akira; Danno, Yuji; and Kawashima, Kouzou, to Kabushiki Kaisha Toshiba. High-pressure metal vapor discharge lamp with characteristic fuse action. 4,686,422, Cl. 315-74.000.

Ito, Kiyoo: *See*—
Hori, Ryoichi; and Ito, Kiyoo, 4,686,650, Cl. 365-189.000.

Ito, Masazumi, to Minolta Camera Kabushiki Kaisha. Copying machine control system. 4,685,797, Cl. 355-14.0SH.

Itoh, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Hydraulic control apparatus for hydraulically-operated power transmitting system having continuously variable transmission. 4,685,358, Cl. 74-868.000.

Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, to Kyowa, Hakko Kogyo Co., Ltd.; and Juridical Foundation, Japanese Foundation for Cancer Research. Recombinant plasmid containing human interferon-beta gene. 4,686,191, Cl. 435-320.000.

Itoh, Yasuhiko: *See*—
Miyake, Yasuo; Tajima, Osamu; Nishioka, Masato; and Itoh, Yasuhiko, 4,686,157, Cl. 429-19.000.

ITT Corporation: *See*—
Heesch, Max O.; and Russo, Vincent, 4,685,729, Cl. 297-193.000.

ITT Industries, Inc.: *See*—
Adam, Fritz G., 4,686,558, Cl. 357-42.000.

Iversen, Alfred A.; Eastman, William J.; and Van Beek, Allen L., to PMT Corporation. Tissue expander system. 4,685,447, Cl. 128-1.00R.

Iverson, Dennis H., to Cyl - Pak, Inc. Molded seal with inclined cross braces. 4,685,685, Cl. 277-205.000.

Iverson, Paul R.: *See*—
Kraemer, John C.; and Iverson, Paul R., 4,686,596, Cl. 360-126.000.

Iwamoto, Hisao: *See*—
Matsubayashi, Hiroshi; Hirota, Kazumi; Iwamoto, Hisao; Fujiwara, Tamio; Sato, Nobuyuki; and Katsura, Tadahiko, 4,686,152, Cl. 428-607.000.

Iwamoto, William T. Offshore structure for deepsea production. 4,685,833, Cl. 405-195.000.

Iwasa, Tadanobu; and Yokoi, Hiroshi, to Toyoda Gosei Co., Ltd. Rubber adhesive. 4,686,122, Cl. 427-388.300.

Iwasaki, Hideki; Yokokawa, Tomohisa; and Kurosaki, Masanori, to Pioneer Electronic Corporation. Program identifier signal receiver. 4,686,707, Cl. 455-200.000.

Iwase, Hiroshi: *See*—
Okuda, Hiroko; and Iwase, Hiroshi, 4,685,370, Cl. 84-1.030.

Iwashita, Shigeo: *See*—
Suzuki, Mikio; Iwashita, Shigeo; and Hayashi, Masaaki, 4,685,528, Cl. 180-79.100.

Iwatsuki, Kunihiro, to Toyota Jidosha Kabushiki Kaisha. Control system and method for an automatic transmission providing smooth engagement action. 4,685,356, Cl. 74-866.000.

Izawa, Hisao: *See*—
Kodama, Kenichi; Tanimoto, Akikazu; Izawa, Hisao; Hamashima, Yoichi; and Hazama, Junji, 4,685,805, Cl. 356-373.000.

Izumi, Akio: *See*—
Nakazawa, Toshiyuki; and Izumi, Akio, 4,685,808, Cl. 356-416.000.

Izumi, Kazuo: *See*—
Nishimuta, Kouichi; Izumi, Kazuo; and Shinsugi, Kazue, 4,685,951, Cl. 71-78.000.

J. T. Posey Company: *See*—
Posey, John T., 4,685,454, Cl. 128-134.000.

Jabs, Robert H., to Westinghouse Electric Corp. Testing device for detecting contact chatter in electrical components with movable contacts, such as relays. 4,686,478, Cl. 324-420.000.

Jackisch, Philip F., to Ethyl Corporation. Dehydrohalogenation of haloethyl brominated benzenes. 4,686,311, Cl. 570-193.000.

Jackle, Heiner G., to Conducta Gesellschaft fur Mess-und Regeltechnik mbH + Co. Method for the protection of and/or monitoring of changes in a reference system in analytical measuring engineering, and reference system with a reference electrode. 4,686,011, Cl. 204-1.00T.

Jackson, David B.: *See*—
Plater, Michael G.; Middleton, Kenneth; and Jackson, David B., 4,685,839, Cl. 405-288.000.

Jacox, John W. Industrial air filter door with standard handle-dog actuation. 4,685,249, Cl. 49-395.000.

Jacrot, Michel, to U.S. Philips Corporation. Incandescent lamp having a reflecting screen and tongue. 4,686,410, Cl. 313-113.000.

James, David R., to James Industries Limited. Toilet aid. 4,685,157, Cl. 4-254.000.

James Industries Limited: *See*—
James, David R., 4,685,157, Cl. 4-254.000.

James River - Norwalk, Inc.: *See*—
Cheshire, James O.; Marinack, Robert J.; Van den Akker, Johannes A.; and Lindgren, Douglas L., 4,686,006, Cl. 162-336.000.

Jamison, Timothy. Anti-theft device, is particular for a garment-hanger. 4,685,572, Cl. 211-4.000.

Jannelli, Ralph J.: *See*—
Marsland, Charles N.; and Jannelli, Ralph J., 4,686,630, Cl. 364-492.000.

Janusch, Alois: *See*—
Cvitas, Vilim; Faltejsek, Karl; Hanke, Reinhart; Janusch, Alois; and Larch, Gerhard, 4,685,899, Cl. 494-44.000.

Japan Vilene Co., Ltd.: *See*—
Sumii, Yoshiyuki; and Fukaya, Soshichi, 4,686,132, Cl. 428-171.000.

Jarrett, Robert D.: *See*—
Honard, Mark R.; Holmes, Mark A.; and Jarrett, Robert D., 4,685,900, Cl. 604-5.000.

Jastrzebski, Lubomir L., to RCA Corporation. Method for forming dielectrically isolated PMOS, NMOS, PNP and NPN transistors on a silicon wafer. 4,685,199, Cl. 437-54.000.

Javorik, Laszlo, to Grotnes Metalforming Systems, Inc. Method for increasing the buckling load capacity and the comprehensive and tensile properties of a column. 4,685,323, Cl. 72-354.000.

Jeanneret nee Aab, Hedwig, to Clinical Plastic Products. Implantable arterial catheter, especially multidose injection catheter. 4,685,905, Cl. 604-247.000.

Jeffrey, Edward N.; and Shen, Chi-Cheong, to United States of America, Navy. JFET current source with high power supply rejection. 4,686,449, Cl. 323-231.000.

Jenkins Metal Corporation: *See*—
Leonard, Robert C., 4,685,285, Cl. 57-356.000.

Jenn, Louis J., to Atrium Structures, Inc. Preconstructed multiple-unit housing. 4,685,260, Cl. 52-169.300.

Jennings, James R., Jr., to RCA Corporation. Drive circuit for pincushion corrector. 4,686,430, Cl. 315-371.000.

Jennings, Michael W. Container inverter. 4,685,553, Cl. 198-405.000.

Jensen, J. Kermit: *See*—
Bush, Harold G.; Mikulas, Martin M., Jr.; Wallsom, Richard E.; and Jensen, J. Kermit, 4,685,535, Cl. 182-63.000.

Jensen, Norman P.: *See*—
Chang, Michael N.; Jensen, Norman P.; Hammond, Milton L.; Zambias, Robert A.; McDonald, John; and Rupprecht, Kathleen M., 4,686,235, Cl. 514-520.000.

Jerman, Zdenek: *See*—
Najmr, Stanislav; Jerman, Zdenek; and Kralicek, Jaroslav, 4,685,935, Cl. 23-304.000.

Jernberg, Gary R. Local delivery of chemotherapeutic agents for the treatment of periodontal disease. 4,685,883, Cl. 433-215.000.

Jessup, Peter; Holstedt, Richard A.; and Baron, Kenneth, to Union Oil Company of California. Metal-boron derivatives as lubricant additives. 4,686,056, Cl. 252-49.700.

Jidosha Kiki Co., Ltd.: *See*—
Ohe, Takeshi; Taniguchi, Yoshiaki; and Arai, Minoru, 4,686,438, Cl. 318-280.000.

John H. Best & Sons, Inc.: *See*—
Ovitz, Ernest G., III, 4,685,573, Cl. 211-46.000.

John Zink Company: *See*—
Nawrot, Thomas L.; Vancha, John; and Mysicka, James C., 4,686,352, Cl. 219-250.000.

Johncock, William: *See*—
Heller, Harold H.; Oliver, Stephen N.; Whittal, John; Johncock, William; Darcy, Paul J.; and Trundle, Clive, 4,685,783, Cl. 351-163.000.

Johns, Kent I.; and Wohlmuth, Clinton J., to Cummins Engine Company, Inc. Method for hardfacing valves. 4,686,348, Cl. 219-121.0PY.

Johnson, Bruce B., to Du Pont de Nemours, E. I., and Company. Multilayer cation exchange membrane. 4,686,120, Cl. 427-370.000.

Johnson, Charles A.; and Young, Jerald A., to Rockwell International Corporation. Free space microscope digitizing aid. 4,686,639, Cl. 364-559.000.

Johnson, Lennart B., to Teradyne, Inc. Daughter board/backplane assembly. 4,686,607, Cl. 361-413.000.

Johnson, Pierce, Jr., to GTE Products Corporation. Reflector-type lamp having reduced focus loss. 4,686,412, Cl. 313-344.000.

Johnson, Timothy J.: *See*—
Harvey, Ian E.; Williams, David G.; Fisher, Barbara J.; and Johnson, Timothy J., 4,686,384, Cl. 307-202.100.

Johnston, Ross W., to RCA Corporation. Rotating head apparatus including a flying tape edge guide. 4,686,597, Cl. 360-130.230.

Johnston, William D.; Czuba, Leonard; and Webster, R. D., to Baxter Travenol Laboratories, Inc. Film laminate for sterile flexible containers. 4,686,125, Cl. 428-35.000.

Jones, Franklin B.; Kerfoot, Charles S.; and Milberger, Walter E., to United States of America, Air Force. Slewing power supply for programmable phase shifter drive. 4,686,448, Cl. 323-212.000.

Jones, Howard: *See*—
Youssefyeh, Raymond D.; Skiles, Jerry W.; Suh, John T.; and Jones, Howard, 4,686,295, Cl. 548-226.000.

Jones, J. Paul, to Patent Research and Development Corp. I.V. drip chamber with built-in pump activated by external means. 4,685,912, Cl. 604-247.000.

Jones, Lawrence S., to United States Pipe and Foundry Company. Large deflection pipe coupling. 4,685,705, Cl. 285-177.000.

Jones, Othel L.: *See*—
Yun, Kyung W.; Jones, Othel L.; and Long, Gerald M., 4,685,489, Cl. 137-543.150.

Jones, Patrick M.: *See*—
Wilson, Louis D.; Jones, Patrick M.; and Vrilakas, Mark, 4,685,333, Cl. 73-478.000.

Jones, Richard D., to UHR Corporation. Residential heating, cooling and energy management system. 4,685,307, Cl. 62-160.000.

Jordan, Charles L.: *See*—
Truckner, William G.; Jordan, Charles L.; and Sharkins, William R., 4,685,505, Cl. 164-415.000.

Jordan, Otis D., to Sunohio Company. Splay bottom fluted metal piles. 4,685,834, Cl. 405-237.000.

Jorgensen, Peter B. Precision vise with independently moveable jaws. 4,685,663, Cl. 269-244.000.

Jorgenson, Michael W.: *See*—
Bailey, Frederick E., Jr.; Jorgenson, Michael W.; and Whitman, Robert D., 4,686,240, Cl. 521-103.000.

Joseph, Louis H., to Dorner Mfg. Corp. Drive mechanism for a live roller conveyor. 4,685,556, Cl. 198-787.000.

Joyce, Stephen A., to Advanced Robotic Technology, Inc. Absolute position mouse. 4,686,329, Cl. 178-18.000.

Jucha, Rhett B.: *See*—
Davis, Cecil J.; Carter, Duane E.; and Jucha, Rhett B., 4,685,999, Cl. 156-643.000.

Junemann, Hubert, to Kochs Alder AG. Method for sewing together a tubular workpiece and a pocket-shaped workpiece and automatic sewing device for carrying out the method. 4,685,407, Cl. 112-262.200.

Jung, Chu W.: *See*—
Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., 4,686,314, Cl. 585-260.000.

Jung Corporation: *See*—
Drury, Alvin C., 4,685,405, Cl. 112-121.150.

Jurid Werke: *See*—
Ziolkowski, Jurgen, 4,685,543, Cl. 188-73.100.

Juridical Foundation, Japanese Foundation for Cancer Research: *See*—
Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, 4,686,191, Cl. 435-320.000.

Justus, Edgar J., to Beloit Corporation. Controlled deflection roll. 4,685,183, Cl. 29-116.0AD.

Kaarmann, Hans; Lubitz, Karl; Mohaupt, Jutta; Vogt, Martina; and Wersing, Wolfram, to Siemens Aktiengesellschaft. Porous adaptation layer in an ultrasonic applicator. 4,686,409, Cl. 310-358.000.

Kabeldon Aktiebolag: *See*—
Palmqvist, Lars I.; and Svensson, Bolennart A., 4,685,189, Cl. 29-450.000.

Kabelmetal Electro GmbH: *See*—
Schneider, Arthur; Baum, Walter; and Zehl, Hermann, 4,686,530, Cl. 340-870.310.

Kabushiki Kaisha Daikin Seisakusho: *See*—
Ohkubo, Masahiro, 4,685,352, Cl. 74-665.0GA.

Kabushiki Kaisha Harmo: *See*—
Hama, Tomio, 4,685,602, Cl. 225-93.000.

Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See*—
Hirao, Katsumi; and Miyake, Toshio, 4,685,597, Cl. 222-389.000.

Kabushiki Kaisha Kaneda Kikai Seisakusho: *See*—
Watanabe, Takemi, 4,685,392, Cl. 101-226.000.

Kabushiki Kaisha Kibun: *See*—
Harada, Masaru, 4,685,877, Cl. 425-190.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Yokoyama, Kageki; and Amano, Itaru, 4,686,129, Cl. 425-47.000.

Kabushiki Kaisha Kosumo Keiki: *See*—
Furuse, Akio, 4,686,638, Cl. 364-558.000.

Kabushiki Kaisha Meidensha: *See*—
Kashiwagi, Yoshiyuki; Noda, Yasushi; and Kitakizaki, Kaoru, 4,686,338, Cl. 200-264.000.

Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See*—
Tsuge, Hiroshi; Fujiwara, Akinori; and Yoshitsugu, Noritada, 4,685,741, Cl. 297-467.000.

Kabushiki Kaisha Toshiba: *See*—
Furuyama, Tohru; and Ohsawa, Takashi, 4,686,456, Cl. 324-73.00R.
Hidaka, Kazutaka; and Sawada, Hisashi, 4,686,537, Cl. 343-786.000.
Ishiyama, Kazufumi, 4,686,408, Cl. 310-334.000.
Ito, Akira; Danno, Yuji; and Kawashima, Kouzou, 4,686,422, Cl. 315-74.000.
Kamohara, Eiji, 4,686,420, Cl. 315-15.000.
Kimura, Seiichirou, 4,685,780, Cl. 350-613.000.
Kunii, Shinpei; and Fujiki, Masao, 4,686,590, Cl. 360-78.000.
Masuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, 4,686,564, Cl. 358-86.000.
Nakamura, Makoto; Suzuki, Hideo; and Kuroki, Toshihiko, 4,686,512, Cl. 340-347.0DD.
Noji, Takashi, 4,686,417, Cl. 313-479.000.
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; Tsuge, Akihiko; and Suzuki, Takao, 4,685,607, Cl. 228-193.000.
Washizuka, Syoichi; Watanabe, Masayuki; Yashiro, Sadao; and Nakanishi, Masae, 4,686,091, Cl. 422-249.000.
Watanabe, Junji, 4,685,794, Cl. 355-7.000.
Yamanaka, Junichi, 4,686,562, Cl. 358-32.000.

Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: *See*—
Takenaka, Kenji; Ohta, Masaki; and Kayukawa, Hiroaki, 4,685,866, Cl. 417-222.000.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Arai, Tohru; and Endo, Junji, 4,686,117, Cl. 427-249.000.
Saito, Akinori; Yamada, Masatoshi; Imai, Kenji; Kawamura, Kiyomi; and Kimura, Masanobu, 4,685,432, Cl. 123-276.000.

Kabushiki Kaisha Yagishita: *See*—
Yagishita, Koichi; Iriyama, Yasunori; and Hirose, Mitsumasa, 4,686,043, Cl. 210-387.000.

Kagi, Stephan: *See*—
Schmid, Adalbert; Kiener, Alfons; Kagi, Stephan; and Claude, Jean P., 4,685,969, Cl. 106-35.000.

Kaji, Hisatsugu: *See*—
Fukuda, Hiroyuki; Shigeta, Masatomo; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,686,072, Cl. 264-29.500.

Kaji, Masayuki: *See*—
Nakabayashi, Masamitsu; Kawai, Hideo; Tatsukawa, Suminori; and Kaji, Masayuki, 4,686,133, Cl. 428-209.000.

Kajita, Hiroshi: *See*—
Iseki, Masahide; Yoshiyama, Toshio; Kajita, Hiroshi; Itakiyo, Masanori; Kusumoto, Hiroshi; Kawamori, Yoshizo; and Kawamoto, Masuo, 4,685,792, Cl. 355-3.0SH.

Kakuchi, Masami: *See*—
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Kallander, Ernest L., Jr.: *See*—
Lee, Kenneth R.; and Kallander, Ernest L., Jr., 4,686,468, Cl. 324-158.00F.

Kaltenthaler, Wolfgang; Kramer, Manfred; and Gelse, Heinz-Dieter, to WABCO Westinghouse Fahrzeugbremsen GmbH. Valve assembly. 4,685,653, Cl. 251-63.600.

Kalvinsh, Ivars Y.; and Astapenok, Elena B., to Institut Organicheskogo Sinteza Akademii Nauk SSR. Pharmaceutical composition and method for treating tumors susceptible to 2-carbamoylaziridine. 4,686,215, Cl. 514-183.000.

Kamada, Hiroshi; and Kita, Sumio, to Sharp Kabushiki Kaisha. Information input apparatus. 4,686,704, Cl. 382-61.000.

Kamaike, Hiroshi, to Mitsubishi Denki Kabushiki Kaisha. Remote call registration system for elevator. 4,685,538, Cl. 187-121.000.

Kambic, Raymond V., to R. R. Brink Locking Systems, Inc. Deadlocked latch having disc and motor actuators. 4,685,709, Cl. 292-201.000.

Kameya, Kazuo, to Elmec Corporation. Finely variable delay line incorporating coarsely and finely varible delay line elements. 4,686,495, Cl. 333-156.000.

Kamins, Harold W.: *See*—
Smith, David S.; and Kamins, Harold W., 4,685,842, Cl. 406-106.000.

Kamiya, Sigeru; Kojima, Akikazu; and Sakakibara, Yasuyuki, to Nippon Soken, Inc. Engine control with function to eliminate minute particles in exhaust gas. 4,685,290, Cl. 60-274.000.

Kamiya, Tetsuro: *See*—
Hara, Kenji; Takahashi, Hiromichi; Kamiya, Tetsuro; and Tsujii, Kaoru, 4,686,211, Cl. 514-148.000.

Kammin, Marvin R.: *See*—
Williams, Donald J.; and Kammin, Marvin R., 4,686,549, Cl. 503-227.000.

Kamohara, Eiji, to Kabushiki Kaisha Toshiba. Electron gun. 4,686,420, Cl. 315-15.000.

Kamoshita, Yasuhiko, to Nippon Gakki Seizo Kabushiki Kaisha. Mode switching device in a disc playback device. 4,686,665, Cl. 369-77.200.

Kanamori, Jun; and Yokoyama, Mamoru, to Oki Electric Industry Co., Ltd. Etching method employing positive photoresist film. 4,686,173, Cl. 430-313.000.

Kanatani, Yoshiharu: *See*—
Fujioka, Yoshihide; Harada, Shigeyuki; Ohba, Toshihiro; Kanatani, Yoshiharu; and Uede, Hisashi, 4,686,426, Cl. 315-169.300.

Kanebo, Ltd.: *See*—
Uno, Toshio; Taguchi, Masahiro; Okuno, Toshimi; Kondo, Hirosato; Sotomura, Mikio; and Tsukamoto, Goro, 4,686,221, Cl. 514-254.000.

Kaneda, Hiroshi; Takagi, Mitsuhiro; and Nakamura, Masaaki, to Matsushita Electric Works, Ltd. Air- and dust-proof cover for flush mounting wiring fixture. 4,685,581, Cl. 220-3.200.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Maeda, Hirofumi; Nakamura, Kyoichi; and Hatamoto, Toshihiro, 4,686,087, Cl. 422-133.000.

Kaneko, Ryoichi: *See*—
Sato, Kazuo; Shiohata, Kouki; Matsushita, Osami; Kikuchi, Katsuaki; Takasumi, Masakazu; Sato, Ichiya; and Kaneko, Ryoichi, 4,685,335, Cl. 73-660.000.

Kaneko, Shozo: *See*—
Nishi, Toshiro; Murakami, Nobuaki; Ueda, Kenji; Shirakawa, Seiichi; Notomi, Akira; Hisamatsu, Kenichi; and Kaneko, Shozo, 4,686,158, Cl. 429-26.000.

Kaneko, Yoshiaki; Saito, Toshiyuki; and Okubo, Naofumi, to Fujitsu Limited. Cavity resonator coupling type power distributor/power combiner comprising coupled input and output cavity resonators. 4,686,494, Cl. 333-137.000.

Kaneyuki, Kazutoshi, to Mitsubishi Denki Kabushiki Kaisha. Accessory drive device in engine. 4,685,355, Cl. 74-796.000.

Kang, Seoh Won, to Morisawa & Co., Ltd. Copolymers of benzotriazol monomers with maleic or fumaric acid derivatives and polymeric material compositions. 4,686,268, Cl. 526-259.000.

Kanpe Katei Toryoo Kabushiki Kaisha: *See*—
Hirao, Katsumi; and Miyake, Toshio, 4,685,597, Cl. 222-389.000.

Kanzaki Paper Mfg. Co., Ltd.: *See*—
Nojima, Kazuhiro; Shono, Kouichi; and Takahashi, Mikio, 4,686,119, Cl. 427-362.000.
Osaki, Shigeyoshi; and Nagata, Shin-ichi, 4,685,569, Cl. 209-571.000.

Kao Corporation: *See*—
Hara, Kenji; Takahashi, Hiromichi; Kamiya, Tetsuro; and Tsujii, Kaoru, 4,686,211, Cl. 514-148.000.
Nakanishi, Takashi, 4,685,178, Cl. 28-118.000.

Kapp, Manfred; Gattermeyer-Kapp, Ulrike; and Harty, Alexander, to Loga Mobel GmbH. Folding chair. 4,685,732, Cl. 297-35.000.

Kappenhagen, George A., to Westinghouse Electric Corp. Elevator system which utilizes both rigid and resilient mounting arrangments for door operator. 4,685,537, Cl. 187-103.000.

Karanewsky, Donald S.; and Dejneka, Tamara, to E. R. Squibb & Sons, Inc. Intermediates for alpha-acyloxy phosphonate angiotensin converting enzyme inhibitors. 4,686,298, Cl. 549-218.000.

Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, to Medicorp Research Laboratories Corporation. Orientable cardiovascular sound. 4,685,473, Cl. 128-772.000.

Kariya, Shigeo: *See*—
Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, 4,685,689, Cl. 280-707.000.

Karl Suss KG, Prazisionsgerate fur Wissenschaft und Industrie GmbH & Co.: *See*—
Gorgon, Georg, 4,686,360, Cl. 250-201.000.

Karle, Dennis W.; Payne, Zie A.; Chung, Fred C.; and Clark, Ross P., to Memorex Corporation. Radiation-cured recording composition with bi-part lube. 4,686,146, Cl. 428-425.900.

Kasai, Isao: *See*—
Ueda, Shigeki; Hatagawa, Toyotsugu; and Kasai, Isao, 4,686,356, Cl. 219-482.000.

Kase, Walter: *See*—
Specht, Hans; and Kase, Walter, 4,685,190, Cl. 29-452.000.

Kashiwagi, Yoshiyuki; Noda, Yasushi; and Kitakizaki, Kaoru, to Kabushiki Kaisha Meidensha. Contact electrode material for vacuum interrupter and method of manufacturing the same. 4,686,338, Cl. 200-264.000.

Kasos N.V.: *See*—
Gonzalez, Sergio, 4,685,779, Cl. 350-604.000.

Kasprzak, Kenneth A., to Dow Corning Corporation. Method for cleaning textiles with cyclic siloxanes. 4,685,930, Cl. 8-139.100.

Kasuya, Kazusato: *See*—
Ando, Tsuneo; Kasuya, Kazusato; Yasuda, Takeru; and Asada, Yukitoshi, 4,685,434, Cl. 123-438.000.

Kato, Heihachi: *See*—
Fujisaki, Kiyonori; Kobayashi, Toshio; and Kato, Heihachi, 4,686,400, Cl. 310-67.00R.

Kato, Masayuki: *See*—
Ueda, Ikuo; Shiokawa, Youichi; Kato, Masayuki; Konishi, Nobukiyo; and Akahane, Atsushi, 4,686,227, Cl. 514-292.000.

Kato, Takayuki; and Miyamoto, Makoto, to Aisin Seiki Kabushiki Kaisha. Oil mist detection method and apparatus. 4,686,453, Cl. 324-65.00R.

Kato, Toshiro: *See*—
Takahashi, Junya; Sasaki, Mitsuru; Noguchi, Hiroshi; and Kato, Toshiro, 4,686,232, Cl. 514-365.000.

Kato, Yujiro: *See*—
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, 4,686,328, Cl. 174-153.00R.

Kato, Yushi, to Diesel Kiki Co., Ltd. Fuel injection pump for internal combustion engines. 4,685,870, Cl. 417-500.000.

Kato, Yuzo; and Suzuki, Hidetoshi, to Canon Kabushiki Kaisha. Method and apparatus for changing image size. 4,686,580, Cl. 358-287.000.

Katoh, Yoshiaki: *See*—
Niwa, Toshio; and Katoh, Yoshiaki, 4,686,286, Cl. 534-637.000.

Katsura, Tadahiko: *See*—
Matsubayashi, Hiroshi; Hirota, Kazumi; Iwamoto, Hisao; Fujiwara, Tamio; Sato, Nobuyuki; and Katsura, Tadahiko, 4,686,152, Cl. 428-607.000.

Katsuragi, Tohoru: *See*—
Sakai, Takuo; and Katsuragi, Tohoru, 4,686,187, Cl. 435-275.000.

Katsuragi, Yasuhiro; Matsuda, Naoki; Saiga, Yoshiko; Kobayashi, Yasunobu; Nakamura, Masakazu; and Satoh, Toshio, to Sunstar Kabushiki Kaisha. Composition for activating function of phagocytes. 4,686,206, Cl. 514-27.000.

Katto, Masayuki; and Sugishima, Eiichi, to Mitsubishi Denki Kabushiki Kaisha. Wave generation circuit for a pulse-width modulation inverter. 4,686,480, Cl. 328-62.000.

Kawaguchi, Nobuhisa: *See*—
Onohara, Masayuki; Kawai, Kenji; Shibata, Masaru; Igarashi, Akira; and Kawaguchi, Nobuhisa, 4,686,124, Cl. 428-35.000.

Kawai, Hideo: *See*—
Nakabayashi, Masamitsu; Kawai, Hideo; Tatsukawa, Suminori; and Kaji, Masayuki, 4,686,133, Cl. 428-209.000.

Kawai, Kenji: *See*—
Onohara, Masayuki; Kawai, Kenji; Shibata, Masaru; Igarashi, Akira; and Kawaguchi, Nobuhisa, 4,686,124, Cl. 428-35.000.

Kawai, Koji; Murata, Hisashi; and Okamoto, Koichi, to Mitsubishi Jukogyo Kabushiki Kaisha. Sheet separating device in a packaging machine. 4,685,272, Cl. 53-389.000.

Kawakami, Eigo: *See*—
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.

Kawakita, Kenji; Nomura, Noboru; and Takemoto, Toyoki, to Matsushita Electric Industrial Co., Ltd. Method of manufacturing isolated semiconductor devices. 4,685,198, Cl. 437-73.000.

Kawamori, Yoshizo: *See*—
Iseki, Masahide; Yoshiyama, Toshio; Kajita, Hiroshi; Itakiyo, Masanori; Kusumoto, Hiroshi; Kawamori, Yoshizo; and Kawamoto, Masuo, 4,685,792, Cl. 355-3.0SH.

Kawamoto, Masuo: *See*—
Iseki, Masahide; Yoshiyama, Toshio; Kajita, Hiroshi; Itakiyo, Masanori; Kusumoto, Hiroshi; Kawamori, Yoshizo; and Kawamoto, Masuo, 4,685,792, Cl. 355-3.0SH.

Kawamura, Kiyomi: *See*—
Saito, Akinori; Yamada, Masatoshi; Imai, Kenji; Kawamura, Kiyomi; and Kimura, Masanobu, 4,685,432, Cl. 123-276.000.

Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Kiuchi, Masayoshi; and Amano, Kenichiro, to Canon Kabushiki Kaisha. Camera. 4,685,789, Cl. 354-173.110.

Kawasaki, Kenzo, to Nippon Gakki Seizo Kabushiki Kaisha. Valve unit for a brass musical instrument. 4,685,372, Cl. 84-392.000.

Kawasaki Steel Corporation: *See*—
Morita, Masahiko; Hashimoto, Osamu; and Tanaka, Tomoo, 4,686,471, Cl. 324-243.000.
Yanazawa, Tadaaki; Tanaka, Teruaki; Noda, Akio; Takeda, Ryo; and Inoue, Masataka, 4,685,320, Cl. 72-250.000.

Kawashima, Kouzou: *See*—
Ito, Akira; Danno, Yuji; and Kawashima, Kouzou, 4,686,422, Cl. 315-74.000.

Kawata, Hiroitsu: *See*—
Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, 4,685,911, Cl. 604-897.000.

Kawazu, Akinobu; Fukada, Atsushi; and Hoshinouchi, Susumu, to Mitsubishi Denki Kabushiki Kaisha. Apparatus for improving surface quality of rotary machine parts. 4,686,349, Cl. 219-121.00L.

Kayukawa, Hiroaki: *See*—
Takenaka, Kenji; Ohta, Masaki; and Kayukawa, Hiroaki, 4,685,866, Cl. 417-222.000.

Kazarian, Sam; Hagene, Steffen D.; McCrimmon, Kenneth A., Jr.; Miller, Robert C.; and Schwerin, James A., to Printronix, Inc. Ribbon fault detection system. 4,685,818, Cl. 400-249.000.

Kazuharu, Teraoka, to Teraoka Seikosho Co., Ltd. Label printer. 4,685,702, Cl. 283-81.000.

Keeley, James W.; Ledoux, Robert V.; and Negi, Virendra S., to Honeywell Information Systems Inc. Test apparatus for testing a multilevel cache system with graceful degradation capability. 4,686,621, Cl. 364-200.000.

Keil, Karl-Heinz; Wullbrandt, Dieter; Keller, Reinhold; and Engelhardt, Friedrich, to Hoechst Aktiengesellschaft. Copolymer, a process for its preparation and its use as enzyme supports. 4,686,243, Cl. 521-149.000.

Keiper Recaro GmbH & Co.: *See*—
Cremer, Heinz P.; Wittig, W.; and Voss, Hans W., 4,685,727, Cl. 297-180.000.
Deegener, Elmar; Voss, Hans W.; and Franzmann, Gunter, 4,685,739, Cl. 297-452.000.

Keller, Hans W. Piezoresistive pressure measuring cell. 4,685,469, Cl. 128-675.000.

Keller, Paul M.: *See*—
Ellis, Ronald W.; Lowe, Robert S.; Keller, Paul M.; and Davison, Andrew J., 4,686,101, Cl. 424-88.000.

Keller, Reinhold: *See*—
Keil, Karl-Heinz; Wullbrandt, Dieter; Keller, Reinhold; and Engelhardt, Friedrich, 4,686,243, Cl. 521-149.000.

Kelley, James O., to Herman Miller, Inc. Work space management system. 4,685,255, Cl. 52-36.000.

Kelley, Paul E.: *See*—
Louris, John N.; Syka, John E. P.; and Kelley, Paul E., 4,686,367, Cl. 250-290.000.

Kelm, Daniel W., to Flexi-Coil Ltd. Method of uniformly distributing granular material. 4,685,843, Cl. 406-181.000.

Kenichi, Inatomi: *See*—
Satoru, Isoda; and Kenichi, Inatomi, 4,686,372, Cl. 250-461.200.

Kennametal, Inc.: *See*—
McCreery, James F.; and Tilstone, Arthur D., 4,685,844, Cl. 407-114.000.

Kennard, Paul A.: *See*—
Syrett, Barry A.; and Kennard, Paul A., 4,686,496, Cl. 333-202.000.

Keown, Jack B. Spring element. 4,685,658, Cl. 267-80.000.
Keptel, Inc.: *See*—
Lynch, Daniel, 4,686,696, Cl. 379-22.000.
Perry, Steven B., 4,686,700, Cl. 379-183.000.
Kerdiles, Jean P.; and Marlot, Roger, to Les Innovations Mecaniques Alimentaires (S.A.R.L.). Crushed carcase separation head and machine. 4,685,626, Cl. 241-74.000.
Kerfoot, Charles S.: *See*—
Jones, Franklin B.; Kerfoot, Charles S.; and Milberger, Walter E., 4,686,448, Cl. 323-212.000.
Kermode, Nigel J.; and Bragg, Charles D., to Procter & Gamble Company, The. Detergent composition. 4,686,062, Cl. 252-99.000.
Kernal, Dickie L.: *See*—
Paschal, James H., Jr.; Freiman, Oscar H.; and Kernal, Dickie L., 4,685,523, Cl. 166-378.000.
Kessels, Jozef L. W.; and Bruekers, Alphons A. M. L., to U.S. Philips Corporation. Method of switching time slots in a TDM-signal and arrangement for performing the method. 4,686,670, Cl. 370-68.000.
Kessler, Harry T., Jr.: *See*—
Anderson, Ronald L.; and Kessler, Harry T., Jr., 4,685,552, Cl. 198-389.000.
Kessler, Heinrich, to Siemens Aktiengesellschaft. Integrated semiconductor circuit. 4,686,507, Cl. 340-347.0AD.
Kessler, Jurgen, to Stumpp & Kurz GmbH & Co. Postive-locking dowel for concrete. 4,685,847, Cl. 411-22.000.
Keystone International, Inc.: *See*—
Scobie, William B.; and Yohner, Paul A., 4,685,611, Cl. 251-306.000.
Khimanych, Anatoly P.: *See*—
Lyakhevich, Genrikh D.; Khimanych, Anatoly P.; Suzansky, Vasily G.; and Kovalerchik, Vulf P., 4,686,007, Cl. 201-3.000.
Kidaloski, Raymond G.; Olinger, Harry S.; and Bryk, Stephen A., to Babcock & Wilcox Company, The. Modular exhaust gas steam generator with common boiler casing. 4,685,426, Cl. 122-214.000.
Kidd, H. Keith: *See*—
Langley, Lawrence W.; and Kidd, H. Keith, 4,686,437, Cl. 318-254.000.
Kiekert GmbH & Co. Kommanditgesellschaft: *See*—
Kleefeldt, Frank, 4,686,529, Cl. 340-825.690.
Kiel, Hans R., to Effem GmbH. Method for producing and filling bottom-fold bags and apparatus for execution of the method. 4,685,276, Cl. 53-459.000.
Kiemle, Peter; Wiese, Jurgen; and Buxbaum, Gunter, to Bayer Aktiengesellschaft. Process for the production of iron oxides epitaxially coated with cobalt the coated oxides and their cue. 4,686,142, Cl. 428-403.000.
Kiener, Alfons: *See*—
Schmid, Adalbert; Kiener, Alfons; Kagi, Stephan; and Claude, Jean P., 4,685,969, Cl. 106-35.000.
Kieras, Ronald E.: *See*—
Kremer, Leon V.; and Kieras, Ronald E., 4,685,820, Cl. 401-260.000.
Kieslich, Klaus: *See*—
Abraham, Wolf-Rainer; Stumpf, Burkhard; and Kieslich, Klaus, 4,686,183, Cl. 435-158.000.
Kikuchi, Katsuaki: *See*—
Sato, Kazuo; Shiohata, Kouki; Matsushita, Osami; Kikuchi, Katsuaki; Takasumi, Masakazu; Sato, Ichiya; and Kaneko, Ryoichi, 4,685,335, Cl. 73-660.000.
Kilbane, Farrell M.; and Dunbar, F. Curtiss, to Armco Inc. Oxidation resistant ferrous base foil and method therefor. 4,686,155, Cl. 428-653.000.
Kimberly-Clark Corporation: *See*—
Enloe, Kenneth M., 4,685,916, Cl. 604-385.00A.
Kimble, James B.: *See*—
Bresson, Clarence R.; Parlman, Robert M.; and Kimble, James B., 4,686,033, Cl. 209-167.000.
Kimoto, Yasuyuki: *See*—
Shimohira, Shigeru; Kimoto, Yasuyuki; and Hirota, Kazuo, 4,685,622, Cl. 239-346.000.
Kimura, Masanobu: *See*—
Saito, Akinori; Yamada, Masatoshi; Imai, Kenji; Kawamura, Kiyomi; and Kimura, Masanobu, 4,685,432, Cl. 123-276.000.
Kimura, Seiichirou, to Kabushiki Kaisha Toshiba. Reflection type optical device. 4,685,780, Cl. 350-613.000.
Kimura, Shigeki, to Mita Industries, Co., Ltd. Laser recording apparatus. 4,686,545, Cl. 346-160.000.
Kincheloe, Dan. Motorcycle safety apparel. 4,685,151, Cl. 2-2.000.
King, Alan G., to Imperial Chemical Industries PLC. Controlled inductive coupling device. 4,685,395, Cl. 102-202.200.
King, Alan G.: *See*—
Birse, Alan D.; and King, Alan G., 4,685,396, Cl. 102-206.000.
King, Duane E.: *See*—
Otstot, Roger S.; and King, Duane E., 4,686,039, Cl. 210-321.100.
King, Gary A., to American Home Products Corporation (Del.). Vinpocetine for pulmonary hemorrhage and edema. 4,686,225, Cl. 514-283.000.
King, Michael M.; and Walter, Helen J., to Boeing Company, The. Multi-layer circuit board bonding method utilizing noble metal coated surfaces. 4,685,210, Cl. 29-830.000.
King, William L., to Samsonite Corporation. Door hook retainer loop patch. 4,685,560, Cl. 206-287.100.
Kinnard, Wolcott. Camera. 4,685,787, Cl. 354-83.000.
Kinnison, W. Wayne: *See*—
Anderson, Herbert L.; Kinnison, W. Wayne; and Lillberg, John W., 4,686,368, Cl. 250-374.000.
Kinoshita, Kazuhiro: *See*—
Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, 4,686,081, Cl. 420-29.000.
Kirchhuebel, Rainer, to Oculus Optikgeraete GmbH. Method for controlling fixation of a patient's eye during perimeter measurements. 4,685,784, Cl. 351-226.000.
Kirker, Garry W.: *See*—
Bell, Weldon K.; Haag, Werner O.; Kirker, Garry W.; and Klocke, Donald J., 4,686,313, Cl. 585-327.000.
Kirsch, Jerome; Kopsco, M. Alan; Markow, Edward; and Sturm, Michael, to Grumman Aerospace Corporation. Transient air and surface contact vehicle. 4,685,641, Cl. 244-105.000.
Kirsch, Richard C.: *See*—
Scheflow, Oliver W.; Roblin, William J., III; Kirsch, Richard C.; and Wunder, William G., 4,685,364, Cl. 83-68.000.
Kishi, Yasuo, to Sanyo Electric Co., Ltd. Photovoltaic device and method of manufacturing thereof. 4,686,321, Cl. 136-244.000.
Kishishita, Hiroshi: *See*—
Endo, Yoshihiro; Mizukami, Etsuo; Kishishita, Hiroshi; and Uede, Hisashi, 4,686,110, Cl. 427-38.000.
Kissel, Waldemar F., Jr. Comprehensive unit transportation system. 4,685,398, Cl. 104-88.000.
Kissin, Yury V.: *See*—
Beach, David L.; and Kissin, Yury V., 4,686,315, Cl. 585-513.000.
Kita, Hideki: *See*—
Haruta, Kenyu; Wakata, Hitoshi; Sato, Yukio; Nagai, Haruhiko; Nakatani, Hajime; and Kita, Hideki, 4,686,682, Cl. 372-87.000.
Kita, Sumio: *See*—
Kamada, Hiroshi; and Kita, Sumio, 4,686,704, Cl. 382-61.000.
Kitakizaki, Kaoru: *See*—
Kashiwagi, Yoshiyuki; Noda, Yasushi; and Kitakizaki, Kaoru, 4,686,338, Cl. 200-264.000.
Kitaya, Katsuhiko; Iida, Naohiro; Miyake, Atsushi; Kobayashi, Mitsuo; and Shirai, Akira, to Nippon Sheet Glass Co., Ltd. Contour shaping apparatus. 4,685,180, Cl. 29-33.00R.
Kiuchi, Masayoshi: *See*—
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Kiuchi, Masayoshi; and Amano, Kenichiro, 4,685,789, Cl. 354-173.110.
Kizaki, Yoshio, to Clarion Co., Ltd. Signal transmission control apparatus. 4,686,702, Cl. 379-373.000.
Klassen, David D.; Moyer, Roy E.; Lastrina, Frank A.; and Tameo, Robert P., to General Electric Company. Axial flow inlet particle separator. 4,685,942, Cl. 55-306.000.
Kleefeldt, Frank, to Kiekert GmbH & Co. Kommanditgesellschaft; and Telefunken Electronic GmbH. Remote-control lock system. 4,686,529, Cl. 340-825.690.
Kleemann, Axel: *See*—
Drauz, Karlheinz; and Kleemann, Axel, 4,686,010, Cl. 203-63.000.
Kleinewefers GmbH: *See*—
Pav, Josef; Wenzel, Reinhard; Svenka, Peter; and Rauf, Richard, 4,685,390, Cl. 100-168.000.
Kleschick, William A.: *See*—
Pearson, Norman R.; and Kleschick, William A., 4,685,958, Cl. 71-93.000.
Klinkner, Walter; and Schmidt, Fritz, to Daimler-Benz Aktiengesellschaft. Apparatus for the road-surface-dependent control of shock absorbers in a vehicle suspension system. 4,685,698, Cl. 280-707.000.
Klitgaard, Peter C.; and Pedersen, Knud G., to Radiometer A/S. Electrode device for transcutaneously measuring a blood gas parameter and for sensing a bioelectrical signal and an electrode assembly comprising such an electrode device. 4,685,465, Cl. 128-635.000.
Klobenzer, Heinz; and Hosei, Peter, to Durr GmbH. Method and apparatus for reprocessing aqueous, oily and greasy cleaning solutions. 4,686,049, Cl. 210-774.000.
Klocke, Donald J.: *See*—
Bell, Weldon K.; Haag, Werner O.; Kirker, Garry W.; and Klocke, Donald J., 4,686,313, Cl. 585-327.000.
Knabel, Walter: *See*—
Sedlmair, Gerhard; Knabel, Walter; and Messerschmidt, Werner, 4,685,696, Cl. 280-625.000.
Knothe, Erich; Melcher, Franz-Josef; and Oldendorf, Christian, to Sartorius GmbH. Balance with counting scale. 4,685,525, Cl. 177-25.000.
Kobayashi, Akihiro: *See*—
Kumagai, Yuugo; Moribe, Isamu; Saito, Takayuki; Fujita, Toshiyuki; and Kobayashi, Akihiro, 4,686,166, Cl. 430-109.000.
Kobayashi, Hirohiko: *See*—
Iriuchijima, Shinobu; Kobayashi, Hirohiko; Aoki, Kyoji; Oda, Takeshi; Shinoyama, Masayuki; and Nosaka, Yoshifumi, 4,686,296, Cl. 548-544.000.
Kobayashi, Hiroshige. Portable container for food or drink to be warmed or cooled. 4,685,588, Cl. 220-428.000.
Kobayashi, Ikuya: *See*—
Ohashi, Kaoru; Kobayashi, Ikuya; Nogami, Takahiro; Shirai, Akira; Nakamura, Kazumasa; and Nomura, Yoshihisa, 4,685,547, Cl. 192-3.00R.
Kobayashi, Jiro; and Yoshikawa, Koichi, to Nippon Kogaku K. K. Positioning apparatus for a circular substrate. 4,685,206, Cl. 29-740.000.
Kobayashi, Junji; and Nakano, Hisashi, to Canon Kabushiki Kaisha. Tape loading device for a recording and/or reproducing apparatus. 4,686,591, Cl. 360-85.000.

Kobayashi, Mitsuo: *See*—
Kitaya, Katsuhiko; Iida, Naohiro; Miyake, Atsushi; Kobayashi, Mitsuo; and Shirai, Akira, 4,685,180, Cl. 29-33.00R.

Kobayashi, Ryuichi: *See*—
Kawamura, Masaharu; Harada, Yoshihito; Kobayashi, Ryuichi; Kiuchi, Masayoshi; and Amano, Kenichiro, 4,685,789, Cl. 354-173.110.

Kobayashi, Toshio: *See*—
Fujisaki, Kiyonori; Kobayashi, Toshio; and Kato, Heihachi, 4,686,400, Cl. 310-67.00R.

Kobayashi, Yasunobu: *See*—
Katsuragi, Yasuhiro; Matsuda, Naoki; Saiga, Yoshiko; Kobayashi, Yasunobu; Nakamura, Masakazu; and Satoh, Toshio, 4,686,206, Cl. 514-27.000.

Kober, Carl L.; and Procter-Gregg, H. David, to Denver Mineral Exploration Corp. Passive geophysical prospection system based upon the detection of the vertical electric field component of telluric currents and method therefor. 4,686,475, Cl. 324-349.000.

Koch, Rainer; and Stockert, Rudiger, to Fischer MET GmbH. Device for bipolar high-frequency coagulation of biological tissue. 4,685,459, Cl. 128-303.170.

Kochs Alder AG: *See*—
Junemann, Hubert, 4,685,407, Cl. 112-262.200.

Kodama, Kenichi; Tanimoto, Akikazu; Izawa, Hisao; Hamashima, Yoichi; and Hazama, Junji, to Nippon Kogaku K.K. Small gap measuring apparatus. 4,685,805, Cl. 356-373.000.

Koeller, Walter, to Mannesmann Aktiengesellschaft. Cooling device for a multistage compressor. 4,685,509, Cl. 165-47.000.

Koen, Myron J., to Burr-Brown Corporation. Subranging analog-to-digital converter with FET isolation circuit between subtraction node and LSB encoder. 4,686,511, Cl. 340-347.0AD.

Koflach Sportgerate Gesellschaft: *See*—
Hensler, Adolf, 4,685,225, Cl. 36-117.000.

Kogure, Hiroshi: *See*—
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, 4,686,328, Cl. 174-153.00R.

Kogure, Osamu: *See*—
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Kohatsu, Iwao: *See*—
Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., 4,686,314, Cl. 585-260.000.

Kohl, Bernhard: *See*—
Rainer, Georg; Figala, Volker; and Kohl, Bernhard, 4,686,230, Cl. 514-338.000.

Kohler, Karl-Heinz: *See*—
Binsack, Rudolf; Kohler, Karl-Heinz; Grigo, Ulrich; Morbitzer, Leo; Bottenbruch, Ludwig; and Heitz, Walter, 4,686,262, Cl. 525-177.000.

Koike, Kazuyuki; Tamagawa, Shigehisa; and Fuchizawa, Tetsuro, to Fuji Photo Film Co., Ltd. Heat-sensitive recording paper. 4,686,546, Cl. 503-200.000.

Kojima, Akikazu: *See*—
Kamiya, Sigeru; Kojima, Akikazu; and Sakakibara, Yasuyuki, 4,685,290, Cl. 60-274.000.

Kojima, Masanori; and Hayakawa, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Video signal reproduction apparatus and method having noise reduction for fast video reproduction. 4,686,584, Cl. 360-10.300.

Kojima, Shigeru; and Obi, Hideo, to Mitsubishi Denki Kabushiki Kaisha. Electric vehicle monitoring system. 4,686,434, Cl. 318-52.000.

Kolar, Cenek, to Behringwerke Aktiengesellschaft. Beta-d-galactose derivatives and their use. 4,686,193, Cl. 436-536.000.

Kolar, Robert, to Steinburg Aktiengesellschaft. Cuff for sealing joints of pipes. 4,685,704, Cl. 285-109.000.

Koller, Franz, to Siemens Aktiengesellschaft. Device for casting electric components. 4,686,073, Cl. 264-102.000.

Kollmorgen Technologies Corporation: *See*—
Langley, Lawrence W.; and Kidd, H. Keith, 4,686,437, Cl. 318-254.000.

Kolpek, Robert A.: *See*—
Rush, Elizabeth A.; Howell, Dan M.; and Kolpek, Robert A., 4,686,649, Cl. 364-900.000.

Komeno, Taichitro: *See*—
Kono, Masao; Komeno, Taichitro; Ishihara, Shoichi; Yamauchi, Akira; and Okabayashi, Tadashi, 4,686,179, Cl. 435-7.000.

Komurasaki, Keiichi: *See*—
Nishimura, Shinji; Wada, Hifumi; and Komurasaki, Keiichi, 4,686,446, Cl. 322-33.000.

Kon, Shigeki, to Tachikawa Spring Co., Ltd. Trim cover assembly for vehicle seats. 4,686,130, Cl. 428-71.000.

Kondo, Hirosato: *See*—
Uno, Toshio; Taguchi, Masahiro; Okuno, Toshimi; Kondo, Hirosato; Sotomura, Mikio; and Tsukamoto, Goro, 4,686,221, Cl. 514-254.000.

Kondo, Kazuo: *See*—
Niwa, Shigeo; Kondo, Kazuo; and Betsuki, Katsutoshi, 4,685,919, Cl. 623-21.000.

Kondo, Nobuaki, to Nissan Motor Co., Ltd. Seat mounting arrangement. 4,685,716, Cl. 296-63.000.

Kondo, Ryuji: *See*—
Murayama, Jin; Kondo, Ryuji; Tamayama, Hiroshi; Yano, Takashi; and Shizukuishi, Makoto, 4,686,573, Cl. 358-213.220.

Kondo, Seiji: *See*—
Kubota, Kazuhiro; and Kondo, Seiji, 4,685,431, Cl. 123-198.0DB.

Konishi, Nobukiyo: *See*—
Ueda, Ikuo; Shiokawa, Youichi; Kato, Masayuki; Konishi, Nobukiyo; and Akahane, Atsushi, 4,686,227, Cl. 514-292.000.

Konishiroku Photo Industry Co., Ltd.: *See*—
Honda, Chiba; Ueda, Koichi; and Suzuki, Akio, 4,686,178, Cl. 430-569.000.
Yagi, Toshihiko; Yamazaki, Katsumasa; Michiue, Kenji; Mochizuki, Yoshiharu; and Goto, Sohei, 4,686,176, Cl. 430-506.000.

Konno, Mutsuo: *See*—
Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, 4,686,079, Cl. 376-444.000.

Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, to Yamanouchi Pharmaceutical Co., Ltd. Patch. 4,685,911, Cl. 604-897.000.

Kono, Masao; Komeno, Taichitro; Ishihara, Shoichi; Yamauchi, Akira; and Okabayashi, Tadashi, to Shionogi & Co., Ltd. 4- or 6-substituted aldosterones, their production and use in immunoassay. 4,686,179, Cl. 435-7.000.

Koob, Judith L.: *See*—
Guilbault, Lawrence J.; McEntee, Thomas C.; and Koob, Judith L., 4,685,932, Cl. 8-490.000.

Kooijmans, Petrus G.: *See*—
Bekooij, Jurrianus; Kooijmans, Petrus G.; Raudenbusch, Werner T.; and Stachowiak, Stephen A., 4,686,248, Cl. 523-404.000.

Kopchick, John J.; Leung, Frederick C.; Livelli, Thomas J.; and Malavarca, Richard H., to Merck & Co., Inc. Encapsulated mouse cells transformed with avian retrovirus-bovine growth hormone DNA, and a method of administering BGH in vivo. 4,686,098, Cl. 424-15.000.

Kopich, Leonard F., to General Motors Corporation. Motor vehicle power train torque strut. 4,685,531, Cl. 180-300.000.

Kopsco, M. Alan: *See*—
Kirsch, Jerome; Kopsco, M. Alan; Markow, Edward; and Sturm, Michael, 4,685,641, Cl. 244-105.000.

Koresh, Jacob E.: *See*—
Soffer, Abraham; Koresh, Jacob E.; and Saggy, Shlomo, 4,685,940, Cl. 55-158.000.

Koseki, Toshikazu; and Saito, Shigeaki, to NEC Corporation. Loopback of a PCM signal with loopback command signal bits placed in each frame of the signal as predetermined ones of overhead bits. 4,686,668, Cl. 370-15.000.

Kosha, Hideaki: *See*—
Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,686,139, Cl. 428-323.000.

Kosson, Robert L.: *See*—
Edelstein, Fred; Haslett, Robert A.; Kosson, Robert L.; and Harwell, William, 4,685,512, Cl. 165-104.140.

Kottman, Rickie A.; Terrill, Robert E.; and Wise, Ann E., to Texas Instruments Incorporated. Method for edge cleaning. 4,685,975, Cl. 134-33.000.

Kouyama, Mikihiro, to Honda Giken Kogyo Kabushiki Kaisha. Steering apparatus of vehicles. 4,685,694, Cl. 280-270.000.

Kouzato, Yasuo, to Canon Kabushiki Kaisha. Tone recording method. 4,686,538, Cl. 346-1.100.

Kovalerchik, Vulf P.: *See*—
Lyakhevich, Genrikh D.; Khimanych, Anatoly P.; Suzansky, Vasily G.; and Kovalerchik, Vulf P., 4,686,007, Cl. 201-3.000.

Kowal, Leonard J.; Schwarz, Albert J.; and Wells, Norman B., to Clevite Industries Inc. Releasable push-to-connect tube fitting. 4,685,706, Cl. 285-322.000.

Koyama, Teruhisa: *See*—
Mitsuno, Tatsuyuki; Koyama, Teruhisa; Shinonaga, Hideo; and Daimon, Akio, 4,686,257, Cl. 524-449.000.

Kraemer, John C.; and Iverson, Paul R., to Minnesota Mining and Manufacturing Company. Recording head core yoke and method of manufacture. 4,686,596, Cl. 360-126.000.

Kralicek, Jaroslav: *See*—
Najmr, Stanislav; Jerman, Zdenek; and Kralicek, Jaroslav, 4,685,935, Cl. 23-304.000.

Kramer, Dale C.: *See*—
Warrington, John E.; and Kramer, Dale C., 4,685,640, Cl. 244-29.000.

Kramer, Manfred: *See*—
Kaltenthaler, Wolfgang; Kramer, Manfred; and Gelse, Heinz-Dieter, 4,685,653, Cl. 251-63.600.

Kratz, Wilbur C.; and Sircar, Shivaji, to Air Products and Chemicals, Inc. Production of oxygen enriched air. 4,685,939, Cl. 55-25.000.

Kraus, Richard B.: *See*—
Bond, Robert H.; and Kraus, Richard B., 4,685,504, Cl. 164-203.000.

Krebs, Peter. Needle construction for axillary plexus brachialis anesthesia. 4,685,904, Cl. 604-164.000.

Kremer, Leon V.; and Kieras, Ronald E., to Pittway Corporation. Applicator device. 4,685,820, Cl. 401-260.000.

Krennbauer, Franz; and Fehringer, Friedrich, to Voest-Alpine Aktiengesellschaft; and VEB Schwermaschinenbau-Kombinat "Ernst Thalman" Magdeburg. Process and apparatus for thermally treating fine-grained solids, particularly for burning ground raw material for making cement. 4,685,970, Cl. 106-100.000.

Krespan, Carl G., to Du Pont de Nemours, E. I., and Company. Polyfluoro gamma-ketoesters and 5-hydroxy gamma lactone analogues thereof. 4,686,300, Cl. 549-313.000.

Krivenko, Valery G.: *See*—
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Gorishnyakov, Alexei I.; Bogorsky, Mikhail V.; and Lazebny, Ivan L., 4,686,346, Cl. 219-110.000.

Kronseder, Hermann. Gluing device for labeling machines. 4,685,417, Cl. 118-261.000.

Krude, Werner, to GKN Automotive Components Inc. Universal joint for tilt steering wheel. 4,685,897, Cl. 464-141.000.

Kruger, Bernd-Wieland: *See*—
Lockhoff, Oswald; Kruger, Bernd-Wieland; Stadler, Peter; Paessens, Arnold; Streissle, Gert; Taylor, Peter; Zeiler, Hans-Joachim; and Metzger, Karl-Georg, 4,686,208, Cl. 514-42.000.

Kruger, Gustav, to Feinmetall GmbH. Probe assembly for circuit-board tester. 4,686,465, Cl. 324-158.00P.

Krupp, Albert: *See*—
Lassmann, Reiner; Krupp, Albert; and Fazekas, Peter, 4,686,455, Cl. 324-73.00R.

Kubo, Toyohide, to AWA Engineering Co., Ltd. ·d of loading magnetic recording tape in cassette cases. 4,685,1… …l. 29-434.000.

Kubota, Kazuhiro; and Kondo, Seiji, to Yamaha. Emergency device for diesel engines. 4,685,431, Cl. 123-198.0DB.

Kubota, Ltd.: *See*—
Tanaka, Tomiho; Suzuki, Takashi; and Watashi, Mitsuo, 4,685,341, Cl. 74-15.820.

Kucera, Clare H.: *See*—
Baranet, Sandra E.; Hodge, Richard M.; and Kucera, Clare H., 4,686,052, Cl. 252-8.551.

Kucheck, Leo, to Label-Aire Inc. Method and apparatus for sensing sheet-like elements. 4,685,982, Cl. 156-64.000.

Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Gorishnyakov, Alexei I.; Bogorsky, Mikhail V.; and Lazebny, Ivan L., to Institute Elektrosvarki Imeni E.O. Patona Akademii Nauk Ukrainskoi SSR. Control device for flash-butt resistance welding machine. 4,686,346, Cl. 219-110.000.

Kugler, Hans-Peter; Eisenreich, Norbert; and Liehmann, Wolfgang, to Fraunhofer-Gesellschaft zur Forderung der Angewadten Forschung e. V. Method and apparatus for the measurement of the location or movement of a body. 4,685,804, Cl. 356-373.000.

Kuhn, Hans-Robert, to Deutsche Thomson-Brandt GmbH. Track follower system employing an optical scanner with automatic control of a rotatably movable phase grating used for the generation and positioning of read beam spots. 4,686,663, Cl. 369-46.000.

Kuhn, S.A.: *See*—
Reber, Walter, 4,685,281, Cl. 56-370.000.

Kuhnel, Donald S.; and Ottenstein, Sidney A., to Innovative Controls, Incorporated. High intensity discharge lamp self-adjusting ballast system with current limiters and a current feedback loop. 4,686,428, Cl. 315-307.000.

Kujas, Erich F., to RCA Corporation. Soldering apparatus. 4,685,608, Cl. 228-227.000.

Kujas, Erich F., to RCA Corporation. Solar panel. 4,686,322, Cl. 136-245.000.

Kulbersh, Irwin, to Amco Corporation. Wall mounting system for shelves. 4,685,575, Cl. 211-90.000.

Kumagai, Yuugo; Moribe, Isamu; Saito, Takayuki; Fujita, Toshiyuki; and Kobayashi, Akihiro, to Hitachi Chemical Co. Electrophoto toner comprising imido group monomer unit in polymer. 4,686,166, Cl. 430-109.000.

Kumazawa, Yukinari: *See*—
Migita, Yoshihiro; Eguchi, Tadashi; Kumazawa, Yukinari; Nakagami, Jozi; Amano, Takehiro; Sota, Kaoru; and Sakakibara, Jinsaku, 4,686,292, Cl. 544-343.000.

Kunii, Shinpei; and Fujiki, Masao, to Kabushiki Kaisha Toshiba. Apparatus for positioning a magnetic head. 4,686,590, Cl. 360-78.000.

Kunzig, Hermann: *See*—
Hahne, Ernst A.; and Kunzig, Hermann, 4,686,069, Cl. 261-92.000.

Kurafuji, Hiroshi, to Citizen Watch Co., Ltd. Cartridge type floppy disk drive. 4,686,594, Cl. 360-99.000.

Kuramitsu, Yuzi: *See*—
Hagihara, Takashi; and Kuramitsu, Yuzi, 4,685,211, Cl. 29-832.000.

Kuraray Co., Ltd.: *See*—
Yoshikawa, Tadao; and Nagata, Shiro, 4,686,143, Cl. 428-411.100.

Kureha Chemical Industry Co., Ltd.: *See*—
Hori, Saburo; and Watanabe, Nobuhiro, 4,685,937, Cl. 51-309.000.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Fukuda, Hiroyuki; Shigeta, Masatomo; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,686,072, Cl. 264-29.500.

Kuribayashi, Kiyoshi; Sakai, Masayuki; Monji, Hideto; Aoki, Masaki; Okinaka, Hideyuki; and Torii, Hideo, to Matsushita Electric Industrial Co., Ltd. Mold for press-molding glass optical elements and a molding method using the same. 4,685,948, Cl. 65-26.000.

Kuroiwa, Wataru: *See*—
Mazuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, 4,686,564, Cl. 358-86.000.

Kuroki, Junsuke; and Sugasawa, Fukashi, to Nissan Motor Company, Ltd. Pitching-suppressive control system and method for an automotive vehicle suspension. 4,686,626, Cl. 364-426.000.

Kuroki, Toshihiko: *See*—
Nakamura, Makoto; Suzuki, Hideo; and Kuroki, Toshihiko, 4,686,512, Cl. 340-347.0DD.

Kurosaki, Masanori: *See*—
Iwasaki, Hideki; Yokokawa, Tomohisa; and Kurosaki, Masanori, 4,686,707, Cl. 455-200.000.

Kurtz, John A.; Cousens, Donald E.; and Dufour, Mark D., to Fairchild Semiconductor Corporation. Apparatus for feeding bonding wire. 4,685,631, Cl. 242-47.000.

Kurtz, John G. Energizable lamp socket. 4,685,759, Cl. 200-51.140.

Kurtz, Robert J., to BioResearch Ithaca Inc. Device for detecting increased pressure in pleural cavity. 4,685,908, Cl. 604-321.000.

Kurz, Karl H.; and Schilling, Andres. Device for the determination of the inner dimensions of hollow organs. 4,685,474, Cl. 128-778.000.

Kushmaul, Richard T.: *See*—
Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.

Kusumoto, Hiroshi: *See*—
Iseki, Masahide; Yoshiyama, Toshio; Kajita, Hiroshi; Itakiyo, Masanori; Kusumoto, Hiroshi; Kawamori, Yoshizo; and Kawamoto, Masuo, 4,685,792, Cl. 355-3.0SH.

Kusumoto, Koji: *See*—
Hyodo, Masakatsu; Kusumoto, Koji; and Sokawa, Takuji, 4,686,126, Cl. 428-36.000.

Kuwazuka, Shunichiro: *See*—
Matsuyama, Haruhiko; Shoji, Fusaji; and Kuwazuka, Shunichiro, 4,686,147, Cl. 428-447.000.

Kyowa, Hakko Kogyo Co., Ltd.: *See*—
Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, 4,686,191, Cl. 435-320.000.

LaBarge, Pierre L., Jr.: *See*—
Mahoney, Robert L., 4,685,831, Cl. 405-156.000.

LaBarge, Robert L.; and Heffner, Robert E., to Aluminum Company of America. Method for making an easy opening container end closure. 4,685,849, Cl. 413-22.000.

Label-Aire Inc.: *See*—
Kucheck, Leo, 4,685,982, Cl. 156-64.000.

Laederach-Zaugg, Barbara. Device for ozonizing a fluid. 4,686,036, Cl. 210-177.000.

L'Air Liquide: *See*—
Bourdon, Guy; and Lampin, Dominique, 4,685,324, Cl. 73-3.000.

Laird, Robert A.: *See*—
Nelson, Lowell F.; and Laird, Robert A., 4,685,402, Cl. 109-65.G00.

Lakoski, Robert P.; and Esakoff, Greg F., to Lama Tool Company. Disk drive locking device. 4,685,312, Cl. 70-14.000.

Lalezari, Farzin, to Ball Corporation. Microstrip antenna system with fixed beam steering for rotating projectile radar system. 4,686,535, Cl. 343-700.0MS.

Lam, Nim C., to Fairchild Semiconductor. ECL circuit with current-splitting network. 4,686,394, Cl. 307-455.000.

Lam, Nim C., to Fairchild Semiconductor. Multiplexer with inhibit for ECL gate array. 4,686,674, Cl. 370-112.000.

Lama Tool Company: *See*—
Lakoski, Robert P.; and Esakoff, Greg F., 4,685,312, Cl. 70-14.000.

LaMonica, Joseph B., to Runnells, Ann. Spear point for fishing spear guns. 4,685,239, Cl. 43-6.000.

Lampin, Dominique: *See*—
Bourdon, Guy; and Lampin, Dominique, 4,685,324, Cl. 73-3.000.

Landis, David E.: *See*—
Tanaka, Aki; and Landis, David E., 4,685,736, Cl. 297-366.000.

Landis, Donald H., to Epic Metals Corporation. Concrete slab-beam form system for composite metal deck concrete construction. 4,685,264, Cl. 52-252.000.

Laney, James W.: *See*—
McCabe, Derald L., 4,686,009, Cl. 202-176.000.

Lang, Kenneth, to Teledyne Industries, Inc. Water filter apparatus. 4,686,037, Cl. 210-221.200.

Langer, Alfred C. Gear headed fastener and drive tool structure. 4,685,848, Cl. 411-402.000.

Langer, Manfred: *See*—
Bauer, Wolfgang; Langer, Manfred; and Sperling, Winfried, 4,686,303, Cl. 560-18.000.

Langley, Lawrence W.; and Kidd, H. Keith, to Kollmorgen Technologies Corporation. Electromechanical energy conversion system. 4,686,437, Cl. 318-254.000.

Lantzsch, Reinhard; and Elbe, Hans-Ludwig, to Bayer Aktiengesellschaft. Preparation of methyl ketones. 4,686,291, Cl. 544-335.000.

LaPier, Theodore M. Rodent trap. 4,685,245, Cl. 43-78.000.

Larac S.p.A.: *See*—
Pizzigoni, Giuseppe; and Parrini, Paolo, 4,686,064, Cl. 252-153.000.

Larch, Gerhard: *See*—
Cvitas, Vilim; Faltejsek, Karl; Hanke, Reinhart; Janusch, Alois; and Larch, Gerhard, 4,685,899, Cl. 494-44.000.

Lare, Donald W.: *See*—
Powers, Carol C.; and Lare, Donald W., 4,685,984, Cl. 156-155.000.

Larson, Marlow. Archery bow quiver. 4,685,438, Cl. 124-24.00A.

Laser Corporation of America: *See*—
Hoag, Ethan; and Zeiders, Glenn, 4,686,680, Cl. 372-58.000.
Hoag, Ethan D., 4,686,685, Cl. 372-107.000.

Lash, Edward G.; Levy, Roger; and Gleason, Everett, to Tishken Products Co. Two cycle air cut-off press. 4,685,367, Cl. 83-626.000.

Lassmann, Reiner; Krupp, Albert; and Fazekas, Peter, to Siemens Aktiengesellschaft. Method for the localization of time-critical events within a clock electronic circuit. 4,686,455, Cl. 324-73.00R.

Lastrina, Frank A.: *See*—
Klassen, David D.; Moyer, Roy E.; Lastrina, Frank A.; and Tameo, Robert P., 4,685,942, Cl. 55-306.000.

Latimer, Paul J., to Babcock & Wilcox Company, The. Method for ultrasonic detection of hydrogen damage in boiler tubes. 4,685,334, Cl. 73-599.000.

Lattion, Andre : *See*—
Slavik, Walter; Engeli, Ernst; and Lattion, Andre , 4,685,283, Cl. 57-263.000.

Lauderback, Sanford K.: *See*—
Willard, G. Fred; Wait, Michael R.; Hutchings, David A.; and Lauderback, Sanford K., 4,685,873, Cl. 264-83.000.

Laughry, David L.: *See*—
Mueller, Richard A.; and Laughry, David L., 4,685,191, Cl. 29-523.000.

Law, S. Edward; and Bowen, Henry D., to University of Georgia Research Foundation Inc., The; and North Carolina State University. Low-volume electrostatic spraying. 4,685,620, Cl. 239-3.000.

Law, Simon M.; and Ngo, Thien M., to Xerox Corporation. Minimum delay high speed bus driver. 4,686,396, Cl. 307-473.000.

Lay, Larry D. Ostomy application device. 4,686,355, Cl. 219-385.000.

Lazebny, Ivan L.: *See*—
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Gorishnyakov, Alexei I.; Bogorsky, Mikhail V.; and Lazebny, Ivan L., 4,686,346, Cl. 219-110.000.

Lechner, Hubert, to LGZ Landis & Gyr Zug AG. One-phase stepping motor. 4,686,398, Cl. 310-41.000.

Leckrone, Michael E., to Vaser, Inc. Angioplasty catheter and method for use thereof. 4,685,458, Cl. 128-303.100.

Leclair, Robert A.: *See*—
Pensabene, Saverio F.; West, Jon K.; Leclair, Robert A.; Van Conant, Carl F.; Catotti, Arthur J.; and Fralick, William L., 4,686,013, Cl. 204-2.100.

Ledoux, Robert V.: *See*—
Keeley, James W.; Ledoux, Robert V.; and Negi, Virendra S., 4,686,621, Cl. 364-200.000.

Lee, Char-Shin, to Lee Wang Industry Ltd. Pressure gauge. 4,685,336, Cl. 73-715.000.

Lee, Ching-Chang. Plural-seasoning distributor. 4,685,627, Cl. 241-169.100.

Lee, Keibock; and Dvorak, Robert V., to Fairchild Camera & Instrument Corp. Electric device or circuit testing method and apparatus. 4,686,628, Cl. 364-481.000.

Lee, Kenneth R.; and Kallander, Ernest L., Jr., to Aseco Corporation. Contact set for test apparatus for testing integrated circuit package. 4,686,468, Cl. 324-158.00F.

Lee, Kevin J.; and Carty, Noel C., to Pak-Poy & Kneebone Pty Ltd.; and Humes Limited. Motor racing track fence. 4,685,656, Cl. 256-13.100.

Lee, Ming-Kwang, to Industrial Technology Research Institute. Method for making planar FET having gate, source and drain in the same plane. 4,685,196, Cl. 437-41.000.

Lee Wang Industry Ltd.: *See*—
Lee, Char-Shin, 4,685,336, Cl. 73-715.000.

Leggett & Platt, Incorporated: *See*—
Higgins, Larry; and Wells, Thomas J., 4,685,162, Cl. 5-247.000.

Leitner Corporation: *See*—
Rastelli, Agostino A., 4,685,311, Cl. 62-258.000.

Leland Stanford Junior University, Board of Trustees of the: *See*—
Macovski, Albert, 4,686,695, Cl. 378-146.000.
Raffin, Thomas A.; and Stevens, John H., 4,686,100, Cl. 424-85.000.

LeMay, Dan B.: *See*—
Renken, Wayne G.; LeMay, Dan B.; and Takahashi, Ricardo M., 4,685,331, Cl. 73-204.000.

Leonard, Robert C., to Jenkins Metal Corporation. Pneumatically controlled anti-balloon device. 4,685,285, Cl. 57-356.000.

Lepine, James J.: *See*—
Carlson, Steven J.; Donald, William W.; and Lepine, James J., 4,685,481, Cl. 134-155.000.

Lersmacher, Bernhard: *See*—
Derks, Pierre L. L. M.; Lersmacher, Bernhard; and Lydtin, Hans-Jurgen, 4,685,946, Cl. 65-17.000.

Les Explosifs Nordex Ltee/Nordex Explosives Ltd.: *See*—
Ross, Cyrus A.; and Thurow, Eberhard, 4,685,375, Cl. 86-20.150.

Les Innovations Mecaniques Alimentaires (S.A.R.L.): *See*—
Kerdiles, Jean P.; and Marlot, Roger, 4,685,626, Cl. 241-74.000.

Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, to Microdynamics, Inc. Compact plotter for generation of accurate plotted images of long length. 4,686,540, Cl. 346-33.00R.

Le Thuillier, Georgette: *See*—
Dodin, Andre; Siffert, Odile; Le Thuillier, Georgette; and Allard, Patrice, 4,686,281, Cl. 530-327.000.

Leung, Frederick C.: *See*—
Kopchick, John J.; Leung, Frederick C.; Livelli, Thomas J.; and Malavarca, Richard H., 4,686,098, Cl. 424-15.000.

Levan, Chris D., to Amoco Corporation. Turbulent flow liquid application apparatus and a method of turbulently applying a liquid onto a substrate. 4,686,123, Cl. 427-424.000.

LeVee, Robert C. Watertight, secured truck enclosure. 4,685,695, Cl. 280-423.00B.

Levine, Michael R., to Honeywell, Inc. Analog to digital conversion employing the system clock of a microprocessor, the clock frequency varying with analog input. 4,685,614, Cl. 236-78.00D.

Levinson, Gary M. Grand piano action. 4,685,371, Cl. 84-239.000.

Levy, Roger: *See*—
Lash, Edward G.; Levy, Roger; and Gleason, Everett, 4,685,367, Cl. 83-626.000.

Lewis, Adam J., Jr.: *See*—
Tew, Claude E.; and Lewis, Adam J., Jr., 4,686,373, Cl. 250-578.000.

Lewis, Henry G., Jr.; and Ng, Sheau-Bao, to RCA Corporation. Analog-to-digital converter as for an adaptive television deghosting system. 4,686,570, Cl. 358-188.000.

Lewis, Henry G., Jr.: *See*—
Campbell, Edward R., III; and Lewis, Henry G., Jr., 4,686,569, Cl. 358-167.000.

Lewis, Robert L., Jr.; and Hudson, J. Albert, to Environmental Products & Services Co., Inc. Boiler penthouse access door. 4,685,586, Cl. 220-305.000.

Lewis, Robert T., to Tribometrics, Inc. Method and device for measuring magnetic particles in a fluid. 4,686,469, Cl. 324-204.000.

Lewis, Robert T.: *See*—
Flaherty, Kenneth A.; Huber, Daniel J.; and Lewis, Robert T., 4,685,993, Cl. 156-475.000.

LGZ Landis & Gyr Zug AG: *See*—
Lechner, Hubert, 4,686,398, Cl. 310-41.000.

Lhospice, Bernard, to Essilor International (Compagnie Generale d'Optique). Spectacles having a detachable front. 4,685,782, Cl. 351-130.000.

Li, Jim Y.; and Weiss, Frederick G., to Triquint Semiconductor, Inc. GaAs voltage reference generator. 4,686,451, Cl. 323-313.000.

Liang, Paul H.: *See*—
Christensen, Joel R.; Liang, Paul H.; and Thompson, Mark E., 4,685,955, Cl. 71-92.000.

Liberty Specialties, Inc.: *See*—
Steenblik, Richard A.; Phillips, Asa R.; Mamay, Daniel P.; Denson, Lawrence K.; Tucker, Richard A.; and Clark, Jimmy M., 4,685,718, Cl. 296-154.000.

Liden, Hadar, to Gotaverken Arendal AB. Device for the storing of oil. 4,685,409, Cl. 114-74.00R.

Liehmann, Wolfgang: *See*—
Kugler, Hans-Peter; Eisenreich, Norbert; and Liehmann, Wolfgang, 4,685,804, Cl. 356-373.000.

Lifeline Systems, Inc.: *See*—
Shapiro, L. Dennis; and Aseltine, Richard G., Jr., 4,686,697, Cl. 379-38.000.

Light Signatures, Inc.: *See*—
Goldman, Robert N., 4,686,527, Cl. 340-825.340.

Lillberg, John W.: *See*—
Anderson, Herbert L.; Kinnison, W. Wayne; and Lillberg, John W., 4,686,368, Cl. 250-374.000.

Lin, Wenlii: *See*—
Ritchey, Mary B.; Cano, Francis R.; O'Hara, Gerald J.; English, James D.; and Lin, Wenlii, 4,686,102, Cl. 424-92.000.

Linde Aktiengesellschaft: *See*—
Strigl, Reinhard, 4,685,965, Cl. 75-93.00R.

Lindemann, Martin K.; and Deacon, Kim, to Sun Chemical Corporation. Printing ink composition. 4,686,260, Cl. 524-458.000.

Lindgren, Douglas L.: *See*—
Cheshire, James O.; Marinack, Robert J.; Van den Akker, Johannes A.; and Lindgren, Douglas L., 4,686,006, Cl. 162-336.000.

Linguanotto, Louis, to Etablissements Linguanotto. Seat, especially work seat, with several positions. 4,685,730, Cl. 297-316.000.

Linker, Frank V., Jr.; and Shuren, Thomas E., to American Tech Manufacturing, Inc. Apparatus and method for lead integrity determination for dip devices. 4,686,637, Cl. 364-550.000.

Lipkie, Curtis A.: *See*—
Spehrley, Charles W., Jr.; Schneider, Gary W.; Lipkie, Curtis A.; and Cranston, Dean H., 4,686,581, Cl. 358-294.000.

Liptak, Frank J., Jr.; and North, Arthur J., to Integrated Technology Work, Inc. Alarm system for computers and the like. 4,686,514, Cl. 340-571.000.

Liptay-Wagner, Nicholas; Renaud, Roland; Pryor, Timothy R.; and Clarke, Donald A., to Diffracto Ltd. Surface reflectivity detector with oil mist reflectivity enhancement. 4,686,374, Cl. 250-571.000.

Liska, Timothy J.; and Scott, Paul F., to Emhart Industries, Inc. Glassware forming apparatus with distributed control and method of operation. 4,685,947, Cl. 65-29.000.

Lisowyj, Bohdan; and Hitchcock, David C., to InterNorth, Inc. Beneficiation of gallium in fly ash. 4,686,031, Cl. 209-2.000.

Litton Systems, Inc.: *See*—
Martin, Graham J., 4,686,683, Cl. 372-94.000.

Litvinenko, Leonid A.: *See*—
Redikultsev, Jury V.; Litvinenko, Leonid A.; Golovlev, Evgeny L.; Golovleva, Ljudmila A.; Chermensky, Dmitry N.; and Skryabin, Georgy K., 4,686,189, Cl. 435-289.000.

Liu, Wen-Chih; Parker, William L.; Singh, Pushpa; and Sykes, Richard B., to E. R. Squibb & Sons, Inc. Aerocavin antibiotics. 4,686,299, Cl. 549-271.000.

Livelli, Thomas J.: *See*—
Kopchick, John J.; Leung, Frederick C.; Livelli, Thomas J.; and Malavarca, Richard H., 4,686,098, Cl. 424-15.000.

Lively, Olin A. Swimming pool control system. 4,685,158, Cl. 4-508.000.

Livick, Lester R. Accessory tool for hand routers. 4,685,496, Cl. 144-134.00D.

Lloyd, Barbara, executor: *See*—
Lloyd, Lawrence L.; and Lloyd, Barbara, executor, 4,685,280, Cl. 56-256.000.

Lloyd, Lawrence L.; and Lloyd, Barbara, executor. Mower cutting unit. 4,685,280, Cl. 56-256.000.

Lo, Tin-Chee, to International Business Machines Corporation. Multifunctional differential cascode voltage switch logic. 4,686,392, Cl. 307-448.000.

Locati, Ronald P., to AMP Incorporated. Electrical contact assembly and method of assembly. 4,685,761, Cl. 439-843.000.

Lochhead, Robert Y.; and Warfield, Debra S. S., to B. F. Goodrich Company, The. Suspension composition for aqueous surfactant systems. 4,686,254, Cl. 524-99.000.

Lochner, Kaspar; Schurmann, Helmut; and Brand, Erich, to Aros Hydraulik GmbH. Pasty damping medium method for preparing and using same. 4,686,057, Cl. 252-62.000.

Lockhoff, Oswald; Kruger, Bernd-Wieland; Stadler, Peter; Paessens, Arnold; Streissle, Gert; Taylor, Peter; Zeiler, Hans-Joachim; and Metzger, Karl-Georg, to Bayer Aktiengesellschaft. Phosphorylated glycosyl-amides, -ureas, -carbamates and -thiocarbamates and method of use. 4,686,208, Cl. 514-42.000.

Loeffler, Herbert H.: *See*—
Hanson, Robert K.; Loeffler, Herbert H.; and Mattera, Philip J., 4,685,387, Cl. 99-450.400.

Lofgren, Peter; and Arthun, Nils, to Steridose Systems AB. Filling device. 4,685,494, Cl. 141-65.000.

Loga Mobel GmbH: *See*—
Kapp, Manfred; Gattermeyer-Kapp, Ulrike; and Harty, Alexander, 4,685,732, Cl. 297-35.000.

Logan, John K. Microwave probe fixture. 4,686,463, Cl. 324-158.00P.

Lohr, Hans-Gunter: *See*—
Herrmann, Gunter; Lohr, Hans-Gunter; and Mozzi, Josef W., 4,685,991, Cl. 156-344.000.

Lohr & Herrmann GmbH: *See*—
Herrmann, Gunter; Lohr, Hans-Gunter; and Mozzi, Josef W., 4,685,991, Cl. 156-344.000.

Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., to Union Carbide Corporation. Manganese-aluminum-phosphorus-silicon-oxide molecular sieves. 4,686,092, Cl. 423-306.000.

Lok, Brent M. T.: *See*—
Flanigen, Edith M.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., 4,686,093, Cl. 423-306.000.

Londerville, Steve B.: *See*—
Binasik, Chester S.; and Londerville, Steve B., 4,685,882, Cl. 431-182.000.

Long, Charles A., Jr., to Long Technologies, Inc. Method and apparatus for the installation of a liner within a conduit. 4,685,983, Cl. 156-64.000.

Long, Gary N.: *See*—
Pellet, Regis J.; Gortsema, Frank P.; Long, Gary N.; and Rabo, Jule A., 4,686,029, Cl. 208-111.000.

Long, Gerald M.: *See*—
Yun, Kyung W.; Jones, Othel L.; and Long, Gerald M., 4,685,489, Cl. 137-543.150.

Long, Gordon K. California-type shoe. 4,685,223, Cl. 36-16.000.

Long Technologies, Inc.: *See*—
Long, Charles A., Jr., 4,685,983, Cl. 156-64.000.

Longhouse, Richard E.; and Vona, Nick, to General Motors Corporation. Engine cooling fan and fan shrouding arrangement. 4,685,513, Cl. 165-121.000.

Lopez, Nephi E., to Boeing Company, The. Antibacklash shaft coupling. 4,685,823, Cl. 403-359.000.

L'Oreal, S.A.: *See*—
Filiz, Alain; and Ascolese, Salvatore J., 4,685,558, Cl. 206-1.500.

Lorenz, Linda F., to United States of America, Agriculture. Wood veneer panels bonded with cellulose solvents. 4,686,140, Cl. 428-342.000.

Lormeau, Jean-Claude; and Choay, Jean, to D.R.O.P.I.C. Process for preparing mucopolysaccharide compositions having high antithrombotic activity, the compositions obtained and their use as medicaments. 4,686,288, Cl. 536-21.000.

Lorthioir, Gerard: *See*—
Cohen, Joseph; and Lorthioir, Gerard, 4,686,025, Cl. 204-245.000.

Loscei, Anthony A., to Cincinnati Milacron Inc. Toggle injection molding clamping force monitor. 4,685,876, Cl. 425-170.000.

Loukos, Isaias. Feeder for highly abrasive materials. 4,685,593, Cl. 222-168.500.

Louris, John N.; Syka, John E. P.; and Kelley, Paul E., to Finnigan Corporation. Method of operating quadrupole ion trap chemical ionization mass spectrometry. 4,686,367, Cl. 250-290.000.

Lovely, John D., to Eastman Kodak Company. Head switching in high resolution video reproduction apparatus. 4,686,582, Cl. 358-310.000.

Lowe, Robert S.: *See*—
Ellis, Ronald W.; Lowe, Robert S.; Keller, Paul M.; and Davison, Andrew J., 4,686,101, Cl. 424-88.000.

Lubitz, Karl: *See*—
Kaarmann, Hans; Lubitz, Karl; Mohaupt, Jutta; Vogt, Martina; and Wersing, Wolfram, 4,686,409, Cl. 310-358.000.

Lubke, Herbert, to Windmoller & Holscher. Impression cylinder for cooperation with a printing cylinder. 4,685,182, Cl. 29-116.00R.

Lubrizol Genetics, Inc.: *See*—
Puhler, Alfred; and Simon, Reinhard, 4,686,184, Cl. 435-172.300.

Lucas Industries: *See*—
Price, Anthony G.; and Campbell, Roy, 4,685,541, Cl. 188-71.400.

Lucas Industries public limited company: *See*—
Rath, Heinrich B.; and Schemmel, Winfried, 4,685,540, Cl. 188-1.110.

Luce, Ronald W. Vehicle air brake system with pressure separating brake housing. 4,685,744, Cl. 303-89.000.

Luebeck, Duane A.: *See*—
Scherer, William C.; Tam, Jimmy W.; and Luebeck, Duane A., 4,685,621, Cl. 239-288.000.

Lurssen, Klaus: *See*—
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,957, Cl. 71-92.000.

Lusk, Norman E.; and Anderson, Ian J. Blank firing attachment for machine gun. 4,685,378, Cl. 89-14.500.

Lyakhevich, Genrikh D.; Khimanych, Anatoly P.; Suzansky, Vasily G.; and Kovalerchik, Vulf P., to Belorussky Politekhnichesky Institut. Method of thermally decomposing polymeric material. 4,686,007, Cl. 201-3.000.

Lydtin, Hans-Jurgen: *See*—
Derks, Pierre L. L. M.; Lersmacher, Bernhard; and Lydtin, Hans-Jurgen, 4,685,946, Cl. 65-17.000.

Lynch, Daniel, to Keptel, Inc. Transmission line signal sensing circuit employing means for conserving power, especially for use with a telephone disconnect circuit, and associated method. 4,686,696, Cl. 379-22.000.

M/A-COM, Inc.: *See*—
Carr, Kenneth; and Blaisdell, Arthur A., 4,686,498, Cl. 333-260.000.

M.C.L. Co., Ltd.: *See*—
Sasaki, Nobuyoshi, 4,685,881, Cl. 425-562.000.

M. K. Products, Inc.: *See*—
Bodewig, Peter, 4,686,350, Cl. 219-130.510.

Maak, Norbert: *See*—
Schieferstein, Ludwig; Hollenberg, Detlef; and Maak, Norbert, 4,685,931, Cl. 8-406.000.

MacCourt, Fergus J.: *See*—
Shust, Ryan E.; and MacCourt, Fergus J., 4,685,340, Cl. 74-11.000.

MacDonald, Robert I.; Hara, Elmer H.; and Poirier, Arthur L., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Optoelectronically switched phase shifter for radar and satellite phased array antennas. 4,686,533, Cl. 342-373.000.

Mace, Guy; Anglard, Andre; and Inss, Andre, to Matra. Missile launcher with ejection shoe. 4,685,377, Cl. 89-1.540.

Machate, Rainer; Vonhausen, Robert; and Hansen, Eckhard, to Voko Franz Vogt & Co. Chair. 4,685,733, Cl. 297-284.000.

Machine Technology, Inc.: *See*—
Rubin, Richard H.; Hillman, Gary; Zarr, Lewis E.; and Hayes, William K., 4,685,852, Cl. 414-404.000.

MacIndoe, Robert: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Macklanburg-Duncan Company: *See*—
Haefner, LeRoy H.; and Rhodes, Stephen M., 4,685,219, Cl. 33-379.000.

Macovski, Albert. NMR imaging system using field compensation. 4,685,468, Cl. 128-653.000.

Macovski, Albert, to Leland Stanford Junior University, Board of Trustees of the. Scanned x-ray selective imaging system. 4,686,695, Cl. 378-146.000.

Maddocks, John W. Instructional printing equipment. 4,685,885, Cl. 434-164.000.

Madock, Michael: *See*—
Huetsch, Larry, 4,685,861, Cl. 414-729.000.

Maeda, Hirofumi; Nakamura, Kyoichi; and Hatamoto, Toshihiro, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Apparatus for thermoplastic resins pre-expanding process. 4,686,087, Cl. 422-133.000.

MagneTek, Inc.: *See*—
Burke, Robert V., 4,686,427, Cl. 315-219.000.

Maguire, Edward A.; Hartnett, Thomas M.; and Gentilman, Richard L., to Raytheon Company. Method of producing aluminum oxynitride having improved optical characteristics. 4,686,070, Cl. 264-1.200.

Mahoney, Robert L., to LaBarge, Pierre L., Jr., a part interest. Apparatus and methods for removing underground cable. 4,685,831, Cl. 405-156.000.

Mahrla, Peter, to Siemens Aktiengesellschaft. Semiconductor element and method for producing the same. 4,686,557, Cl. 357-34.000.

Majer, Rocco, to Fertimont S.p.A. Process for granulating chemical products and apparatus therefor. 4,686,115, Cl. 427-212.000.

Makin, Ronald P., to BOC Group plc, The. Inhalation apparatus. 4,686,354, Cl. 219-301.000.

Makishima, Tokuo: *See*—
Tachikawa, Mamoru; Sakuma, Masato; Ueki, Satoshi; Imai, Chihiro; and Makishima, Tokuo, 4,686,199, Cl. 502-104.000.

Malavarca, Richard H.: *See*—
Kopchick, John J.; Leung, Frederick C.; Livelli, Thomas J.; and Malavarca, Richard H., 4,686,098, Cl. 424-15.000.

Malhotra, Sudarshan K.; and Evoy, Ingrid L., to Dow Chemical Company, The. Diphenoxymethyl-pyridinephosphates and phosphorothioates having herbicidal properties. 4,685,953, Cl. 71-86.000.

Malik, Vedpal S.; Semp, Bernard A.; Bravo, Hernan G.; and Teng, Daniel M., to Philip Morris Incorporated. Thermophilic denitrification of tobacco. 4,685,478, Cl. 131-297.000.

Mamay, Daniel P.: *See*—
Steenblik, Richard A.; Phillips, Asa R.; Mamay, Daniel P.; Denson, Lawrence K.; Tucker, Richard A.; and Clark, Jimmy M., 4,685,718, Cl. 296-154.000.

Manco, Richard J.: *See*—
Deal, Gregory K.; and Manco, Richard J., 4,686,691, Cl. 377-54.000.
Mandy, Zoltan A.: *See*—
Stegmann, Rudolph; and Mandy, Zoltan A., 4,685,310, Cl. 62-217.000.
Mankey, Harry S.: *See*—
Oswald, Norman D.; Mankey, Harry S.; Dean, Robert R.; and Hudler, Dennis W., 4,685,527, Cl. 180-14.300.
Mannesmann AG: *See*—
Stueke, Walter, 4,685,985, Cl. 156-185.000.
Mannesmann Aktiengesellschaft: *See*—
Koeller, Walter, 4,685,509, Cl. 165-47.000.
Manning, Donald L.; and Hood, Delos W., to Transpec Inc. Vehicle entrance ramp. 4,685,858, Cl. 414-537.000.
Manville Sales Corporation: *See*—
Wilson, Jerry F., 4,685,566, Cl. 206-429.000.
Marchesi, Franco, to Rockwell-Rimoldi S.p.A. Looper for sewing machines. 4,685,406, Cl. 112-199.000.
Marchetti, Augusto. Accident prevention device for motorized-belt pulling units for cardboard box taping machines. 4,685,269, Cl. 33-167.000.
Marcus, Bonita K.: *See*—
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,686,092, Cl. 423-306.000.
Maremont Corporation: *See*—
Bunning, Ernst; and Hutchins, Wayne, 4,685,235, Cl. 42-75.020.
Marinack, Robert J.: *See*—
Cheshire, James O.; Marinack, Robert J.; Van den Akker, Johannes A.; and Lindgren, Douglas L., 4,686,006, Cl. 162-336.000.
Marker International: *See*—
Sedlmair, Gerhard; Knabel, Walter; and Messerschmidt, Werner, 4,685,696, Cl. 280-625.000.
Markow, Edward: *See*—
Kirsch, Jerome; Kopsco, M. Alan; Markow, Edward; and Sturm, Michael, 4,685,641, Cl. 244-105.000.
Marks, Arthur E. Entrapment apparatus. 4,685,244, Cl. 43-58.000.
Marks, Ronald F.: *See*—
Flint, Ephraim B.; Gruber, Peter A.; Marks, Ronald F.; Olive, Graham; and Zingher, Arthur R., 4,685,606, Cl. 228-123.000.
Marley Tile A.G.: *See*—
Cooper, Christopher A., 4,685,265, Cl. 52-277.000.
Marlot, Roger: *See*—
Kerdiles, Jean P.; and Marlot, Roger, 4,685,626, Cl. 241-74.000.
Marom, Emanuel: *See*—
Soffer, Bernard H.; Efron, Uzi; and Marom, Emanuel, 4,686,647, Cl. 364-850.000.
Marschner, Werner: *See*—
Wolff, Joachim; Wolf, Karlheinz; and Marschner, Werner, 4,685,933, Cl. 8-527.000.
Marsh, Jesse. Document holder. 4,685,821, Cl. 402-4.000.
Marshall, George C., Jr., to General Dynamics, Pomona Division. Missile part assembly and transport cart. 4,685,859, Cl. 414-590.000.
Marsico, Ronald; and Freimark, Bruce. Catenary sag adjustment using added weights. 4,686,325, Cl. 174-40.00R.
Marsland, Charles N.; and Jannelli, Ralph J., to Process Systems, Inc. Load management control system and method. 4,686,630, Cl. 364-492.000.
Martin, Graham J., to Litton Systems, Inc. Laser angular rate sensor with dithered mirrors. 4,686,683, Cl. 372-94.000.
Maruyama, Kouji; Nomura, Takeshi; Ueno, Hiroshi; and Inaba, Naomi, to Toa Nenryo Kogyo Kabushiki Kaisha. Process for polymerization of olefins. 4,686,265, Cl. 526-125.000.
Masaki, Akira: *See*—
Yamada, Minoru; Usui, Mitsuru; Masaki, Akira; Nakanishi, Keiichirou; and Tokuda, Masahide, 4,686,606, Cl. 361-385.000.
Maschinen Fabrik Scharer AG: *See*—
Philipp, Peter R.; and Weber, Jean, 4,685,284, Cl. 57-295.000.
Maschinerfabrik Alfred Schmermund GmbH & Co.: *See*—
Oberdorf, Manfred, 4,685,554, Cl. 198-468.600.
Mason, William H., III. Adjustable biaxial stretcher. 4,685,230, Cl. 38-102.500.
Massarsch, Karl, to S.A. Compagnie Internationale des Pieux Armes Frankignoul. Method of increasing the compressibility of liquid-saturated material. 4,685,835, Cl. 405-263.000.
Massey, Peyton L. Prehensile thumb and finger prosthesis. 4,685,924, Cl. 623-63.000.
Mastromoro, John F. Windshield cleaning system. 4,685,168, Cl. 15-250.00R.
Masuda, Toru; and Shibano, Yasuji, to Hosiden Electronics Co., Ltd. Method of manufacturing a jack. 4,685,212, Cl. 29-876.000.
Masuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, to Kabushiki Kaisha Toshiba; and American Television & Communications Corp. Communication data processing device of cable television system. 4,686,564, Cl. 358-86.000.
Masumitsu, Noriyuki: *See*—
Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, 4,686,081, Cl. 420-29.000.
Mathys, Robert, to Robert Mathys Co. Hip joint socket. 4,685,923, Cl. 623-22.000.
Matiere, Marcel. Modular construction system for a covered structure. 4,685,829, Cl. 405-124.000.
Matra: *See*—
Mace, Guy; Anglard, Andre; and Insa, Andre, 4,685,377, Cl. 89-1.540.
Mats Lundberg: *See*—
Dziewanowski, Andre ; Piotrowski, Krzysztof; and Zaremba, Krzysztof, 4,686,075, Cl. 264-209.200.
Matsubayashi, Hiroshi; Hirota, Kazumi; Iwamoto, Hisao; Fujiwara, Tamio; Sato, Nobuyuki; and Katsura, Tadahiko, to Toyo Seikan Kaisha, Ltd. Packaging material comprising iron foil, and container and container lid composed thereof. 4,686,152, Cl. 428-607.000.
Matsuda, Hiroto: *See*—
Ikeda, Masami; Shibata, Makoto; Takahashi, Hiroto; and Matsuda, Hiroto, 4,686,544, Cl. 346-140.00R.
Matsuda, Naoki: *See*—
Katsuragi, Yasuhiro; Matsuda, Naoki; Saiga, Yoshiko; Kobayashi, Yasunobu; Nakamura, Masakazu; and Satoh, Toshio, 4,686,206, Cl. 514-27.000.
Matsuda, Toshiro, to Nissan Motor Company, Limited. Anti-skid brake control system for automotive brake system with extrapolation of wheel acceleration. 4,685,746, Cl. 303-106.000.
Matsui Manufacturing Co., Ltd.: *See*—
Sakuichi, Sakakibara; Yoshiaki, Tokuda; Tamio, Nagai; Yorinobu, Takino; and Tomiro, Arai, 4,685,810, Cl. 366-150.000.
Matsumoto, Kouichi, to Sharp Kabushiki Kaisha. Cleaner for an electrophotographic copying machine. 4,685,798, Cl. 355-15.000.
Matsumoto, Tadashi: *See*—
Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, 4,686,191, Cl. 435-320.000.
Matsuno, Kenji; Yasumuro, Hisakazu; Taira, Kazuo; Imatani, Tsuneo; and Toyoshima, Makoto, to Toyo Seikan Kaisha Limited. Process and apparatus for producing welded can body with an organic coated welded part. 4,685,989, Cl. 156-244.130.
Matsuo, Mamoru: *See*—
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.
Matsuo, Tadaaki: *See*—
Tomita, Masao; Hashima, Akio; Ohta, Haruo; and Matsuo, Tadaaki, 4,686,583, Cl. 358-336.000.
Matsuoka, Shunji: *See*—
Tada, Kunio; Nishiwaki, Yoshikazu; and Matsuoka, Shunji, 4,685,763, Cl. 350-96.140.
Matsushita Electric Industrial Co., Ltd.: *See*—
Kawakita, Kenji; Nomura, Noboru; and Takemoto, Toyoki, 4,685,198, Cl. 437-73.000.
Kuribayashi, Kiyoshi; Sakai, Masayuki; Monji, Hideio; Aoki, Masaki; Okinaka, Hideyuki; and Torii, Hideo, 4,685,948, Cl. 65-26.000.
Tomita, Masao; Hashima, Akio; Ohta, Haruo; and Matsuo, Tadaaki, 4,686,583, Cl. 358-336.000.
Ueda, Shigeki; Hatagawa, Toyotsugu; and Kasai, Isao, 4,686,356, Cl. 219-482.000.
Ueshiba, Nozomu; Fukada, Tetsuji; and Ise, Yukihiko, 4,685,767, Cl. 350-255.000.
Yoshino, Kimiaki; Ando, Eiji; Miyazaki, Jinsei; and Morimoto, Kazuhisa, 4,686,169, Cl. 430-339.000.
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Beny, Janos; and Yamasaki, Toshio, 4,685,894, Cl. 446-435.000.
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DeMeester, Gordon D.; and Mattson, Rodney A., 4,686,692, Cl. 378-4.000.
Maurer, Fritz, to Bayer Aktiengesellschaft. Preparation of pyrimidyl phosphoric acid derivatives and intermediates. 4,686,290, Cl. 544-243.000.
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Maxaxam Corporation: *See*—
Brackett, George E., 4,685,346, Cl. 74-427.000.
Maximal Security Products Ltd.: *See*—
Grant, John T., 4,686,335, Cl. 200-61.45R.

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May, Sam. Graphite/metal matrix gun barrel. 4,685,236, Cl. 42-76.020.

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Mayer, Julius. Quick-mount thread cutting attachment for lathes. 4,685,362, Cl. 82-5.000.

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Mazza, Frank. Grinding mill. 4,685,625, Cl. 241-36.000.

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McBeth, James B., to Teleflex Incorporated. Air bleeding system for hydraulic closed circuits. 4,685,293, Cl. 60-327.000.

McCabe, Derald L., to Laney, James W., a part interest. Distillation system. 4,686,009, Cl. 202-176.000.

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McCracken, Oliver W.: *See*—
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McCreery, James F.; and Tilstone, Arthur D., to Kennametal, Inc. Cutting insert. 4,685,844, Cl. 407-114.000.

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Kazarian, Sam; Hagene, Steffen D.; McCrimmon, Kenneth A., Jr.; Miller, Robert C.; and Schwerin, James A., 4,685,818, Cl. 400-249.000.

McCurdy, Gaylord W. Drawing holder nut wrench. 4,685,360, Cl. 81-119.000.

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McDaniel, Robert J. Open hole pipe recovery circulation valve. 4,685,520, Cl. 166-332.000.

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Chang, Michael N.; Jensen, Norman P.; Hammond, Milton L.; Zambias, Robert A.; McDonald, John; and Rupprecht, Kathleen M., 4,686,235, Cl. 514-520.000.

McDonald, Malcolm C. Aquatic exercise system. 4,685,667, Cl. 272-71.000.

McDonnell Douglas Corporation: *See*—
Garner, Gerald D.; and Wozniak, Walter E., 4,685,966, Cl. 73-583.000.
Noel, Vincent R.; and Van Shoubrouek, Fred B., 4,685,376, Cl. 89-1.140.

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McFalls, Bob L.; Myers, Timothy S.; and Fudala, Chester, to Ferro Manufacturing Corporation. Tilt worm recliner. 4,685,735, Cl. 297-362.000.

McFarland, Robert E. Apparatus for loading a wheelchair or similar object. 4,685,860, Cl. 414-720.000.

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Satkamp, Gary A., 4,685,184, Cl. 29-148.40R.

McGreal, Joseph E., Jr.: *See*—
Howell, John L.; McGreal, Joseph E., Jr.; Nemeth, Edward J.; Waslo, Stephen; and Feinman, Jerome, 4,686,090, Cl. 423-244.000.

McKay, Scot A., to Gault, Gregory. Vibration isolator camera mount. 4,685,649, Cl. 248-594.000.

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Rizzardo, Dennis P., 4,685,160, Cl. 5-68.000.
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McMurray, William, to General Electric Company. Fault protection for GTO voltage-source inverters. 4,686,618, Cl. 363-58.000.

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Boissevain, Mathew G., 4,685,389, Cl. 100-93.0RP.

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Parks, Stephen K., 4,685,901, Cl. 604-96.000.

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Medow, Sheila. Activity tote. 4,685,570, Cl. 206-579.000.

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Meerman, Arend H.: *See*—
Van der Hulst, Herman L.; and Meerman, Arend H., 4,685,713, Cl. 294-90.000.

Meguro, Jun-Ichi; Solberg, Arne L.; Stark, William A.; and Hsei, Paul K., to American Hospital Supply Corporation. Cuvette belts and manufacture of same. 4,685,880, Cl. 425-416.000.

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Shimohira, Shigeru; Kimoto, Yasuyuki; and Hirota, Kazuo, 4,685,622, Cl. 239-346.000.

Meissner, David C.: *See*—
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Meitzler, Allen H., to Ford Motor Company. Apparatus for applying high frequency ultrasonic energy to cleaning and etching solutions. 4,686,406, Cl. 310-322.000.

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Karle, Dennis W.; Payne, Zie A.; Chung, Fred C.; and Clark, Ross P., 4,686,146, Cl. 428-425.900.

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Amidon, Gordon L.; Higuchi, Takeru; and Dressman, Jennifer B., 4,685,918, Cl. 604-892.000.
Atkinson, Joseph G.; Baldwin, John J.; and McClure, David E., 4,686,222, Cl. 514-255.000.
Chang, Michael N.; Jensen, Norman P.; Hammond, Milton L.; Zambias, Robert A.; McDonald, John; and Rupprecht, Kathleen M., 4,686,235, Cl. 514-520.000.
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Huff, Joel R.; Baldwin, John J.; Sakurai, Yojiro; Vacca, Joseph P.; and Guare, James P., Jr., 4,686,226, Cl. 514-285.000.
Kopchick, John J.; Leung, Frederick C.; Livelli, Thomas J.; and Malavarca, Richard H., 4,686,098, Cl. 424-15.000.

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Merger, Franz; and Schwarz, Wolfgang, to BASF Aktiengesellschaft. Simultaneous preparation of nitriles and acrylamide or methacrylamide. 4,686,302, Cl. 558-314.000.
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Merlo, Michele. Incremental optical encoder with a tuned vernier. 4,686,362, Cl. 250-231.0SE.
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Mester, Zoltan C.; and Aitken, Edward J., to Union Oil Company of California. Sorbent for reducing sulfur oxide emissions from catalytic cracking units and process for producing the sorbent. 4,686,204, Cl. 502-406.000.
Metcalf, Jeffrey D., to Sundstrand Corporation. Quick disconnect mechanism. 4,685,550, Cl. 192-67.00R.
Metzger, Karl G.: *See*—
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Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.
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Miki, Yasuhiro: *See*—
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Yoshino, Kimiaki; Ando, Eiji; Miyazaki, Jinsei; and Morimoto, Kazuhisa, 4,686,169, Cl. 430-339.000.
Miyoshi, Hideaki, to Mitsubishi Denki Kabushiki Kaisha. Laminated layer type fuel cell. 4,686,159, Cl. 429-39.000.
Miyoshi, Katsuyoshi: *See*—
Terano, Minoru; Soga, Hirokazu; Inoue, Masuo; and Miyoshi, Katsuyoshi, 4,686,200, Cl. 502-112.000.
Miyoshi, Takahito: *See*—
Aonuma, Masashi; Watanabe, Hideomi; Miyoshi, Takahito; and Okita, Tsutomu, 4,686,149, Cl. 428-522.000.
Mize, Max D. Booster handle. 4,685,760, Cl. 439-822.000.
Mizoguchi, Ryohei: *See*—
Mure, Hiroshi; Mizoguchi, Ryohei; Yokoi, Shinichi; Fujihara, Shigeru; and Ichikawa, Kaoru, 4,686,687, Cl. 373-22.000.
Mizukami, Etsuo: *See*—
Endo, Yoshihiro; Mizukami, Etsuo; Kishishita, Hiroshi; and Uede, Hisashi, 4,686,110, Cl. 427-38.000.
Mizukami, Masamichi: *See*—
Sugio, Akitoshi; Okabe, Masao; Mizukami, Masamichi; and Sekine, Yoshihiko, 4,686,131, Cl. 428-158.000.
Mizukami, Tamio: *See*—
Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, 4,686,191, Cl. 435-320.000.
Mizusawa, Nobutoshi: *See*—
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.
Mobil Oil Corporation: *See*—
Bell, Weldon K.; Haag, Werner O.; Kirker, Garry W.; and Klocke, Donald J., 4,686,313, Cl. 585-327.000.
Chu, Yung-Feng; and Chester, Arthur W., 4,686,312, Cl. 585-315.000.
Dellinger, J. A.; Goins, Neal R.; and Reilly, Theresa A., 4,686,657, Cl. 367-75.000.
Givens, Wyatt W.; and Bowden, Edgar A., 4,686,477, Cl. 324-366.000.
Horodysky, Andrew G., 4,686,055, Cl. 252-32.70E.
Morrison, Roger A., 4,686,316, Cl. 585-708.000.
Quann, Richard J.; and Tabak, Samuel A., 4,686,317, Cl. 585-860.000.
Ranganayaki, Rambabu P., 4,686,476, Cl. 324-350.000.
Stowe, Lawrence R.; and Strubhar, Malcolm K., 4,685,519, Cl. 166-278.000.
Mobilio, Dominick: *See*—
Ferdinandi, Eckhardt S.; Mobilio, Dominick; Sabatucci, Joseph P.; and Humber, Leslie G., 4,686,213, Cl. 514-161.000.
Mochizuki, Yoshiharu: *See*—
Yagi, Toshihiko; Yamazaki, Katsumasa; Michiue, Kenji; Mochizuki, Yoshiharu; and Goto, Sohei, 4,686,176, Cl. 430-506.000.
Mohaupt, Jutta: *See*—
Kaarmann, Hans; Lubitz, Karl; Mohaupt, Jutta; Vogt, Martina; and Wersing, Wolfram, 4,686,409, Cl. 310-358.000.
Molins Machine Company: *See*—
Craemer, Robert H., 4,685,394, Cl. 101-426.000.
Molnlycke AB: *See*—
Agren, Magnus; and Nordqvist, Percy, deceased, 4,685,907, Cl. 604-304.000.
Monestier, Jacques, to Compagnie Generale de Participations, S.A., a part interest. Total hand prostheses. 4,685,929, Cl. 623-64.000.
Moneta, Ted C. Wind shelter. 4,685,484, Cl. 135-117.000.
Monji, Hideto: *See*—
Kuribayashi, Kiyoshi; Sakai, Masayuki; Monji, Hideto; Aoki, Masaki; Okinaka, Hideyuki; and Torii, Hideo, 4,685,948, Cl. 65-26.000.
Monon Corporation: *See*—
Banerjea, Tara N., 4,685,721, Cl. 296-181.000.
Monsanto Company: *See*—
Otstot, Roger S.; and King, Duane E., 4,686,039, Cl. 210-321.100.
Monsigny, Jean, to Aciers et Outillage Peugeot. Safety belt winder having a cylindrical body. 4,685,635, Cl. 242-107.40A.
Montedison S.p.A: *See*—
Palla, Ottorino; Gozzo, Franco; and Radice, Marco, 4,685,954, Cl. 71-90.000.
Moog Inc.: *See*—
Moog, William C., 4,685,813, Cl. 384-118.000.
Moog, William C., to Moog Inc. Hydrostatic bearing. 4,685,813, Cl. 384-118.000.
Moravek, Peter; Trebitz, Bernd; Weller, Albrecht; and Amsel, Klaus, to Braun Aktiengesellschaft. Air cushioned support sole plate. 4,685,229, Cl. 38-84.000.
Morbitzer, Leo: *See*—
Binsack, Rudolf; Kohler, Karl-Heinz; Grigo, Ulrich; Morbitzer, Leo; Bottenbruch, Ludwig; and Heitz, Walter, 4,686,262, Cl. 525-177.000.
Moreau, Jean-Pierre L., to Chantiers du Nord et de la Mediterranee. Equipment for extracting ores from sea beds. 4,685,742, Cl. 299-8.000.
Morgan, Melissa M.: *See*—
Israel, Cheryl; and Morgan, Melissa M., 4,685,599, Cl. 224-170.000.
Mori, Chuzo, to Carl Manufacturing Co., Ltd. Index device. 4,685,232, Cl. 40-381.000.
Mori, Saburo: *See*—
Nomura, Hirokazu; Sato, Yukihiko; Nishi, Yasuhiko; Higurashi, Mizuho; and Mori, Saburo, 4,686,341, Cl. 219-54.000.
Moribe, Isamu: *See*—
Kumagai, Yuugo; Moribe, Isamu; Saito, Takayuki; Fujita, Toshiyuki; and Kobayashi, Akihiro, 4,686,166, Cl. 430-109.000.
Morihiro, Yoshiyuki: *See*—
Takada, Mitsuyuki; Morihiro, Yoshiyuki; and Takasago, Hayato, 4,685,203, Cl. 29-620.000.
Morimoto, Hideaki; and Hashimoto, Hiromi, to NEC Corporation. Channel switching system. 4,686,675, Cl. 371-8.000.
Morimoto, Kazuhisa: *See*—
Yoshino, Kimiaki; Ando, Eiji; Miyazaki, Jinsei; and Morimoto, Kazuhisa, 4,686,169, Cl. 430-339.000.
Morimoto, Masayuki: *See*—
Ide, Tatsumi; Morimoto, Masayuki; and Chiba, Kei, 4,686,500, Cl. 335-128.000.
Morimoto, Taiji: *See*—
Yano, Seiki; Yamamoto, Saburo; Hayashi, Hiroshi; and Morimoto, Taiji, 4,686,679, Cl. 372-48.000.
Morisawa & Co., Ltd.: *See*—
Kang, Seoh Won, 4,686,268, Cl. 526-259.000.
Morishima, Kazuo, to Honda Giken Kogyo K.K. Supplementary light device for motorcycles. 4,686,656, Cl. 362-72.000.
Morita, Masahiko; Hashimoto, Osamu; and Tanaka, Tomoo, to Kawasaki Steel Corporation. System for online-detection of the transformation value and/or flatness of steel or a magnetic material by detecting changes in induced voltages due to interlinked magnetic fluxes in detecting coils. 4,686,471, Cl. 324-243.000.
Morris, James A.: *See*—
Farbood, Mohamad I.; Morris, James A.; and Seitz, Eugene W., 4,686,307, Cl. 560-205.000.
Morris, Robert A.; and Rajotte, Paul T., to General Electric Company. Modular ground fault circuit breaker. 4,686,600, Cl. 361-42.000.
Morrison, Roger A., to Mobil Oil Corporation. Production of butanes from propane. 4,686,316, Cl. 585-708.000.
Morse, Albert I., to USM Corporation. Powder reinforcing machine. 4,685,418, Cl. 118-503.000.
Mortensen, Svend: *See*—
Engell, John E.; and Mortensen, Svend, 4,686,012, Cl. 204-1.00T.
Morton, Alec J.: *See*—
Renner, Karl H.; and Morton, Alec J., 4,686,644, Cl. 364-724.000.
Morton Thiokol, Inc.: *See*—
Guilbault, Lawrence J.; McEntee, Thomas C.; and Koob, Judith L., 4,685,932, Cl. 8-490.000.
Rei, Nuno M., 4,686,239, Cl. 521-55.000.
Mosele, Joseph, to BBC Brown, Boveri & Company, Limited. Overvoltage arrester. 4,686,603, Cl. 361-118.000.
Moskovich, Jacob, to U.S. Precision Lens, Incorporated. Projection lens. 4,685,774, Cl. 350-432.000.
Motorola, Inc.: *See*—
Cho, Frederick Y.; and Hickernell, Fred S., 4,686,111, Cl. 427-38.000.
Ferrer, Enrique; and Schlosser, Charles M., 4,686,528, Cl. 340-825.440.
Teng, Ker-Wen; Nguyen, Bich-Yen; and Parrillo, Louis C., 4,686,552, Cl. 357-23.600.
Mount, Houston B., II, to Amoco Corporation. Viscosity-temperature compensator for hydraulic systems. 4,685,294, Cl. 60-329.000.
Moyer, Roy E.: *See*—
Klassen, David D.; Moyer, Roy E.; Lastrina, Frank A.; and Tameo, Robert P., 4,685,942, Cl. 55-306.000.
Mozdzen, Barbara R.: *See*—
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.
Mozzi, Josef W.: *See*—
Herrmann, Gunter; Lohr, Hans-Gunter; and Mozzi, Josef W., 4,685,991, Cl. 156-344.000.
MTS Vektronics Corporation: *See*—
Eaton, Homer L., 4,685,636, Cl. 242-129.000.
Mueller, Richard A.; and Laughry, David L., to Cities Service Oil and Gas Corporation. Apparatus and process for selectively expanding to join one tube into another tube. 4,685,191, Cl. 29-523.000.
Muhr, Richard; and Schroder, Werner, to Muhr und Bender. Profile-bar cutter with angled blade movement. 4,685,365, Cl. 83-198.000.
Muhr und Bender: *See*—
Muhr, Richard; and Schroder, Werner, 4,685,365, Cl. 83-198.000.
Mukai, Hirokatsu: *See*—
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.
Mulholland, Wayne A.: *See*—
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.

Muller, Franz: *See*—
Ehrlinger, Friedrich J.; Muller, Franz; Simon, Herbert; and Sailer, Hubert, 4,685,343, Cl. 74-331.000.

Mullet, Willis. Overhead door panel and method of making. 4,685,266, Cl. 52-309.110.

Mulso, Francis A.: *See*—
Wachowski, Raymond J.; and Mulso, Francis A., 4,685,712, Cl. 293-128.000.

Mulvey, Patrick J.: *See*—
Howery, Richard W.; Rosenquist, Niles R.; Pyles, Robert A.; and Mulvey, Patrick J., 4,686,277, Cl. 528-493.000.
Pyles, Robert A.; and Mulvey, Patrick J., 4,686,046, Cl. 210-651.000.

Mundt, Peter; Neuhold, Arnold; and Pohl, Claus, to Geimuplast Peter Mundt GmbH. & Co. KG. Integral plastic frame for holding a film slide. 4,685,785, Cl. 353-120.000.

Murakami, Nobuaki: *See*—
Nishi, Toshiro; Murakami, Nobuaki; Ueda, Kenji; Shirakawa, Seiichi; Notomi, Akira; Hisamatsu, Kenichi; and Kaneko, Shozo, 4,686,158, Cl. 429-26.000.

Murata, Hisashi: *See*—
Kawai, Koji; Murata, Hisashi; and Okamoto, Koichi, 4,685,272, Cl. 53-389.000.

Murata, Kazushi: *See*—
Ohta, Takeshi; Nakamura, Hiroshi; and Murata, Kazushi, 4,685,850, Cl. 414-225.000.

Murata Kikai Kabushiki Kaisha: *See*—
Takada, Hiroshi, 4,685,492, Cl. 139-68.000.

Murayama, Jin; Kondo, Ryuji; Tamayama, Hiroshi; Yano, Takashi; and Shizukuishi, Makoto, to Fuji Photo Film Co., Ltd. Charge transfer type image pickup apparatus for producing field-interlaced video signals. 4,686,573, Cl. 358-213.220.

Murdock, Bruce: *See*—
Boso, Brian; Beenen, Gerhard J.; and Murdock, Bruce, 4,685,185, Cl. 29-157.00C.

Mure, Hiroshi; Mizoguchi, Ryohei; Yokoi, Shinichi; Fujihara, Shigeru; and Ichikawa, Kaoru, to Nippon Steel Corporation. Anode system for plasma heating usable in a tundish. 4,686,687, Cl. 373-22.000.

Murphy, William F. Eye-drops application device. 4,685,906, Cl. 604-300.000.

Murray, Alexander P.; Becker, Lawrence F., Jr.; Slater, Clifton G.; and Skriba, Michael C., to Westinghouse Electric Corp. Ozone oxidation of deposits in cooling systems of nuclear reactors. 4,685,971, Cl. 134-2.000.

Murray, Fred R., Jr.: *See*—
Powers, Steven J., 4,685,213, Cl. 30-123.000.

Murray, John H., to Milliken Research Corporation. Mop construction. 4,685,167, Cl. 15-228.000.

Muto, Rudolph, to Muto, Rudolph. Specimen collector. 4,685,472, Cl. 128-760.000.

Mydock, Donald R.: *See*—
Bush, J. Finley; and Mydock, Donald R., 4,686,198, Cl. 502-25.000.

Myers, Carl J., to Warner & Swasey Company, The. Machine tool. 4,685,361, Cl. 82-2.00R.

Myers, Lawrence R.; and Gaiser, Robert F., to Allied Corporation. Threaded sleeve member for connecting master cylinder to vacuum booster. 4,685,299, Cl. 60-547.100.

Myers, Michael O., to Dow Chemical Company, The. Process for preparing poly (alkylene carbonates). 4,686,276, Cl. 528-371.000.

Myers, Timothy S.: *See*—
McFalls, Bob L.; Myers, Timothy S.; and Fudala, Chester, 4,685,735, Cl. 297-362.000.

Mysicka, James C.: *See*—
Nawrot, Thomas L.; Vancha, John; and Mysicka, James C., 4,686,352, Cl. 219-250.000.

Myster, Lloyd S.: *See*—
McMurtry, Ronald V., 4,685,443, Cl. 126-247.000.

Nabisco Brands: *See*—
Pinto, Albert A., 4,685,878, Cl. 425-202.000.

Nagai, Haruhiko: *See*—
Haruta, Kenyu; Wakata, Hitoshi; Sato, Yukio; Nagai, Haruhiko; Nakatani, Hajime; and Kita, Hideki, 4,686,682, Cl. 372-87.000.

Nagai, Masahide; and Yokose, Kazutoshi, to Seiko Instruments Inc. Industrial robot. 4,685,862, Cl. 414-744.00A.

Naganawa, Hiroshi: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, 4,686,308, Cl. 564-219.000.

Nagata, Satoshi, to Canon Kabushiki Kaisha. Image data output apparatus. 4,686,525, Cl. 340-790.000.

Nagata, Shin-ichi: *See*—
Osaki, Shigeyoshi; and Nagata, Shin-ichi, 4,685,569, Cl. 209-571.000.

Nagata, Shiro: *See*—
Yoshikawa, Tadao; and Nagata, Shiro, 4,686,143, Cl. 428-411.100.

Nagayasu, Katsumi: *See*—
Honda, Masaru; Chiba, Takanori; Imokawa, Toshiaki; Harada, Yoshito; and Nagayasu, Katsumi, 4,686,145, Cl. 428-425.900.

Nagtzaam, Nicolaas P.; Bronke, Cornelis; and Brasz, Albert J. H., to Stamicarbon B.V. Device and process for recovering polymer from a solution. 4,686,279, Cl. 528-501.000.

Naito, Minoru. Process for producing powdery paint additive comprising reacting a dimer acid polyamide, a hydroxyl-substituted fluororesin and a polyisocyanate. 4,686,261, Cl. 525-131.000.

Najmr, Stanislav; Jerman, Zdenek; and Kralicek, Jaroslav, to Vysoka Skola chemicko-technologicka. Process for producing pure magnesium sulphite. 4,685,935, Cl. 23-304.000.

Nakabayashi, Masamitsu; Kawai, Hideo; Tatsukawa, Suminori; and Kaji, Masayuki, to Takeda Chemical Industries, Ltd.; and Showa Aluminum Corporation. Closure material for sealing glass containers. 4,686,133, Cl. 428-209.000.

Nakagami, Jozi: *See*—
Migita, Yoshihiro; Eguchi, Tadashi; Kumazawa, Yukinari; Nakagami, Jozi; Amano, Takehiro; Sota, Kaoru; and Sakakibara, Jinsaku, 4,686,292, Cl. 544-343.000.

Nakagawa, Koji: *See*—
Azuma, Shizuo; Hiramatsu, Toshiyuki; Nakagawa, Koji; and Ichikawa, Yataro, 4,685,952, Cl. 71-86.000.

Nakahashi, Masako: *See*—
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; Tsuge, Akihiko; and Suzuki, Takao, 4,685,607, Cl. 228-193.000.

Nakajima, Junichi; Nakayama, Kenji; and Takizawa, Takeshi, to Fuji Kogyo K.K. Barking machine. 4,685,498, Cl. 144-208.00B.

Nakajima, Takashi, to Nippon Paint Company, Ltd. Method and apparatus for powder surface treating. 4,685,419, Cl. 118-620.000.

Nakamichi Corporation: *See*—
Goto, Hideo; and Imamura, Akira, 4,686,588, Cl. 360-76.000.

Nakamura, Hiroshi: *See*—
Ohta, Takeshi; Nakamura, Hiroshi; and Murata, Kazushi, 4,685,850, Cl. 414-225.000.

Nakamura, Kazumasa: *See*—
Ohashi, Kaoru; Kobayashi, Ikuya; Nogami, Takahiro; Shirai, Akira; Nakamura, Kazumasa; and Nomura, Yoshihisa, 4,685,547, Cl. 192-3.00R.

Nakamura, Kyoichi: *See*—
Maeda, Hirofumi; Nakamura, Kyoichi; and Hatamoto, Toshihiro, 4,686,087, Cl. 422-133.000.

Nakamura, Makoto; Suzuki, Hideo; and Kuroki, Toshihiko, to Kabushiki Kaisha Toshiba. Integrated digital circuit for processing speech signal. 4,686,512, Cl. 340-347.0DD.

Nakamura, Masaaki: *See*—
Kaneda, Hiroshi; Takagi, Mitsuhiro; and Nakamura, Masaaki, 4,685,581, Cl. 220-3.200.

Nakamura, Masakazu: *See*—
Katsuragi, Yasuhiro; Matsuda, Naoki; Saiga, Yoshiko; Kobayashi, Yasunobu; Nakamura, Masakazu; and Satoh, Toshio, 4,686,206, Cl. 514-27.000.

Nakamura, Steve: *See*—
Roberts, Auston K.; Trainer, William E.; Nakamura, Steve; Duffin, Leon C.; and Biederman, David L., 4,686,094, Cl. 423-322.000.

Nakanishi, Haruo; Ohba, Hisao; and Sakaki, Hirokazu, to Fujo Photo Film Co., Ltd. Lithographic support and process of preparing the same. 4,686,021, Cl. 204-129.750.

Nakanishi, Keiichirou: *See*—
Yamada, Minoru; Usui, Mitsuru; Masaki, Akira; Nakanishi, Keiichirou; and Tokuda, Masahide, 4,686,606, Cl. 361-385.000.

Nakanishi, Masae: *See*—
Washizuka, Syoichi; Watanabe, Masayuki; Yashiro, Sadao; and Nakanishi, Masae, 4,686,091, Cl. 422-249.000.

Nakanishi, Takashi, to Kao Corporation. Tampon-forming device. 4,685,178, Cl. 28-118.000.

Nakano, Hisashi: *See*—
Kobayashi, Junji; and Nakano, Hisashi, 4,686,591, Cl. 360-85.000.

Nakatani, Hajime: *See*—
Haruta, Kenyu; Wakata, Hitoshi; Sato, Yukio; Nagai, Haruhiko; Nakatani, Hajime; and Kita, Hideki, 4,686,682, Cl. 372-87.000.

Nakauchi, Kenji, to Fuji Photo Film Co., Ltd. Thermal developing apparatus. 4,686,351, Cl. 219-216.000.

Nakayama, Kenji; and Takeuchi, Yayoi, to NEC Corporation. Line equalizer operable in response to an input signal of a variable data rate. 4,686,686, Cl. 375-11.000.

Nakayama, Kenji: *See*—
Nakajima, Junichi; Nakayama, Kenji; and Takizawa, Takeshi, 4,685,498, Cl. 144-208.00B.

Nakayama, Yoshiro, to Mitsubishi Denki Kabushiki Kaisha. Wire guide for electrode discharge machining. 4,686,344, Cl. 219-69.00W.

Nakazawa, Mitsunobu: *See*—
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.

Nakazawa, Toshiyuki; and Izumi, Akio, to Fuji Electric Corporate Research and Development Co., Ltd. Method of discriminating colors of an object. 4,685,808, Cl. 356-416.000.

Nakazeki, Tsugito; Nanami, Shoji; and Okada, Koichi, to NTN Toyo Bearing Co., Ltd. Controlled radial magnetic bearing device. 4,686,404, Cl. 310-90.500.

Namiki, Junji, to NEC Corporation. TDMA communications apparatus having adaptive burst duration. 4,686,672, Cl. 370-95.000.

Nanami, Shoji: *See*—
Nakazeki, Tsugito; Nanami, Shoji; and Okada, Koichi, 4,686,404, Cl. 310-90.500.

Nara, Akio: *See*—
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.

Nara, Kiyoshi; and Honda, Susumu, to Takeda Chemical Industries, Ltd. Production of monomeric human γ-interferon. 4,686,284, Cl. 530-351.000.

Narui, Satoshi: *See—*
Takahashi, Naoya; Endo, Keiji; Matsuzaka, Eiichi; Narui, Satoshi; and Sato, Atsushi, 4,686,548, Cl. 503-213.000.

Naruo, Kyoichi: *See—*
Tani, Yoshio; Yabe, Masao; and Naruo, Kyoichi, 4,686,543, Cl. 346-137.000.

Nason, Clyde K.: *See—*
Cable, Vaughn P.; Nason, Clyde K.; and Culp, Gordon W., 4,685,903, Cl. 604-154.000.

Nason, Dale L.; and Gray, Richard L., to Reliance Universal, Inc. Conductive coatings for wood products. 4,686,108, Cl. 427-27.000.

National Can Corporation: *See—*
Pulciani, Sam C.; and Szczerba, Robert M., 4,685,582, Cl. 220-66.000.

National Distillers and Chemical Corporation: *See—*
Hoyt, John M.; and Blazey, Steven D., 4,686,264, Cl. 525-330.400.

National Research Development Corporation: *See—*
McCanny, John V.; McWhirter, John G.; and Wood, Kenneth W., 4,686,645, Cl. 364-754.000.
McEwan, Peter M.; and Thomas, Iorwerth, 4,686,393, Cl. 307-31.000.

Natori, Minoru: *See—*
Yoshida, Hirohiko; and Natori, Minoru, 4,686,519, Cl. 340-701.000.

Natsuhara, Toshiya: *See—*
Osawa, Izumi; Doi, Isao; and Natsuhara, Toshiya, 4,686,164, Cl. 430-63.000.

Natsui, Yukio: *See—*
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, 4,686,328, Cl. 174-153.00R.

Nawaki, Masaru, to Sharp Kabushiki Kaisha. Optical Transmission circuit. 4,686,709, Cl. 455-613.000.

Nawrot, Thomas L.; Vancha, John; and Mysicka, James C., to John Zink Company. Electronic pressing iron. 4,686,352, Cl. 219-250.000.

NCR Corporation: *See—*
Mazumder, Ali T.; and Fairey, Brian M., 4,685,816, Cl. 400-157.100.

Neary, Robin P.: *See—*
Carter, Leewood C.; and Neary, Robin P., 4,685,610, Cl. 229-23.00R.

Nebon, Jean-Pierre; and Gerbert-Gaillard, Alain, to Gerin, Merlin. Frame with clip-on draw-in grips for a withdrawable multipole circuit breaker. 4,686,334, Cl. 200-50.0AA.

NEC Corporation: *See—*
Hagihara, Takashi; and Kuramitsu, Yuzi, 4,685,211, Cl. 29-832.000.
Ide, Tatsumi; Morimoto, Masayuki; and Chiba, Kei, 4,686,500, Cl. 335-128.000.
Koseki, Toshikazu; and Saito, Shigeaki, 4,686,668, Cl. 370-15.000.
Morimoto, Hideaki; and Hashimoto, Hiromi, 4,686,675, Cl. 371-8.000.
Nakayama, Kenji; and Takeuchi, Yayoi, 4,686,686, Cl. 375-11.000.
Namiki, Junji, 4,686,672, Cl. 370-95.000.
Ohta, Yoshinori; Sakuma, Isamu; Hibiya, Taketoshi; and Sakaguchi, Mitsuhito, 4,686,678, Cl. 372-33.000.
Otani, Susumu, 4,686,484, Cl. 329-109.000.
Sato, Fumihiko; and Yamada, Kazuyoshi, 4,686,395, Cl. 307-455.000.
Sato, Osamu, 4,686,690, Cl. 375-114.000.

Negi, Virendra S.: *See—*
Keeley, James W.; Ledoux, Robert V.; and Negi, Virendra S., 4,686,621, Cl. 364-200.000.

Negishi, Hideo; and Wakabayashi, Mikiya, to Sanden Corporation. Article dispensing mechanism for vending of cylindrical articles. 4,685,590, Cl. 221-241.000.

Neiman: *See—*
Neyret, Guy, 4,685,313, Cl. 70-186.000.

Nellcor Incorporated: *See—*
Goldberger, Daniel S.; Coreman, James E.; and McCord, Kenneth R., 4,685,464, Cl. 128-633.000.

Nelson, James A., to Ryko Manufacturing Company. Vehicle wash and dryer. 4,685,169, Cl. 15-302.000.

Nelson, Linda H., to General Electric Company. High energy irradiated polycarbonates containing organic borates. 4,686,245, Cl. 522-163.000.

Nelson, Loren C.: *See—*
Schulz, David A.; and Nelson, Loren C., 4,686,096, Cl. 423-447.100.

Nelson, Lowell F.; and Laird, Robert A., to Shaw-Walker Company, The. Fire resistive cabinet for storing easily damageable electronic data storage materials. 4,685,402, Cl. 109-65.000.

Nelson, Peter H.; Allison, Anthony C.; and Eugui, Elsie M., to Syntex (U.S.A) Inc. Mycophenolic acid derivatives in the treatment of inflammatory diseases, in particular rheumatoid arthritis. 4,686,234, Cl. 514-469.000.

Nelson, Stephen J., to Upjohn Company, The. Anthelmintic spiroketals useful for killing parasitic worms. 4,686,297, Cl. 549-214.000.

Nemeth, Edward J.: *See—*
Howell, John L.; McGreal, Joseph E., Jr.; Nemeth, Edward J.; Waslo, Stephen; and Feinman, Jerome, 4,686,090, Cl. 423-244.000.

Nentwig, Wolfgang: *See—*
Beck, Manfred; and Nentwig, Wolfgang, 4,686,263, Cl. 525-245.000.

NERA Company: *See—*
Oliker, Michael D., 4,685,938, Cl. 55-20.000.

Nestor, John J., Jr.; and Schreiber, Alain B., to Syntex (U.S.A.) Inc. Analogs of transforming and epidermal growth factor fragments for therapy and diagnosis. 4,686,283, Cl. 530-327.000.

Nethery, John L., Jr.: *See—*
Berry, Peter F.; Miller, Wendell D.; and Nethery, John L., Jr., 4,686,694, Cl. 378-120.000.

Neuhold, Arnold: *See—*
Mundt, Peter; Neuhold, Arnold; and Pohl, Claus, 4,685,785, Cl. 353-120.000.

New Japan Radio Co., Ltd.: *See—*
Sato, Yoshihiko; and Yamamoto, Nobuaki, 4,686,413, Cl. 313-346.00R.

Newlin, Thomas L., Jr. Weightlifting belt. 4,685,668, Cl. 272-123.000.

Neyret, Guy, to Neiman. Anti-theft device with key presence security. 4,685,313, Cl. 70-186.000.

Nezworski, James E., to Perlick Company, The. Keg valve assembly improved for fast filling. 4,685,598, Cl. 222-400.700.

Ng, Fred K., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Database backup method. 4,686,620, Cl. 364-200.000.

Ng, Sheau-Bao: *See—*
Lewis, Henry G., Jr.; and Ng, Sheau-Bao, 4,686,570, Cl. 358-188.000.

Ng, Yee Seung; Contois, Lawrence E.; Mitchell, John D.; and Walling, James D., to Eastman Kodak Company. Electrophotographic color imaging method. 4,686,163, Cl. 430-47.000.

NGK Spark Plug Co., Ltd.: *See—*
Niwa, Shigeo; Kondo, Kazuo; and Betsuki, Katsutoshi, 4,685,919, Cl. 623-21.000.

Ngo, Thien M.: *See—*
Law, Simon M.; and Ngo, Thien M., 4,686,396, Cl. 307-473.000.

Nguyen, Bich-Yen: *See—*
Teng, Ker-Wen; Nguyen, Bich-Yen; and Parrillo, Louis C., 4,686,552, Cl. 357-23.600.

Nguyen, Dinh: *See—*
Brigham, William D.; and Nguyen, Dinh, 4,685,292, Cl. 60-320.000.

Nguyen, Yen T.: *See—*
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.

Nickell, Louis G.; Stach, Leonard J.; and Hokama, Takeo, to Sandoz Ltd. Method of increasing the yield of sugar from sugarcane. 4,685,960, Cl. 71-94.000.

Niddam, Roger: *See—*
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,685,473, Cl. 128-772.000.

Nidiffer, Charles A.; and Van Camp, Raymond E., to Bunn-O-Matic Corporation. Coffee grinder with bag actuated switch. 4,685,624, Cl. 241-36.000.

Nigrelli, Biagio J., Sr. Carton opening apparatus. 4,685,275, Cl. 53-458.000.

Nihon Jumbo Kabushiki Kaisha: *See—*
Takahashi, Hiroshi, 4,685,209, Cl. 29-806.000.

Nilsson, Bjarne. Disc filter element for a rotatable disc filter. 4,686,040, Cl. 210-331.000.

Nippon Air Brake Co., Ltd.: *See—*
Imanaka, Asaji, 4,685,750, Cl. 303-15.000.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Kamoshita, Yasuhiko, 4,686,665, Cl. 369-77.200.
Kawasaki, Kenzo, 4,685,372, Cl. 84-392.000.
Yamaoka, Shigemitsu, 4,686,520, Cl. 340-703.000.

Nippon Kogaku K. K.: *See—*
Iida, Yoshikazu; and Ishizuki, Kenji, 4,685,786, Cl. 354-21.000.
Kobayashi, Jiro; and Yoshikawa, Koichi, 4,685,206, Cl. 29-740.000.
Takatsu, Norihiko, 4,686,572, Cl. 358-213.130.
Uematsu, Kimio, 4,685,790, Cl. 354-203.000.

Nippon Kogaku K.K.: *See—*
Kodama, Kenichi; Tanimoto, Akikazu; Izawa, Hisao; Hamashima, Yoichi; and Hazama, Junji, 4,685,805, Cl. 356-373.000.

Nippon Kokan Kabushiki Kaisha: *See—*
Nomura, Hirokazu; Sato, Yukihiko; Nishi, Yasuhiko; Higurashi, Mizuho; and Mori, Saburo, 4,686,341, Cl. 219-54.000.

Nippon Kokan Koji Kabushiki Kaisha: *See—*
Nomura, Hirokazu; Sato, Yukihiko; Nishi, Yasuhiko; Higurashi, Mizuho; and Mori, Saburo, 4,686,341, Cl. 219-54.000.

Nippon Mayer Co., Ltd.: *See—*
Ono, Kohtaro, 4,686,134, Cl. 428-222.000.

Nippon Paint Company, Ltd.: *See—*
Nakajima, Takashi, 4,685,419, Cl. 118-620.000.

Nippon Petrochemicals Company, Limited: *See—*
Takahashi, Naoya; Endo, Keiji; Matsuzaka, Eiichi; Narui, Satoshi; and Sato, Atsushi, 4,686,548, Cl. 503-213.000.

Nippon Sheet Glass Co., Ltd.: *See—*
Kitaya, Katsuhiko; Iida, Naohiro; Miyake, Atsushi; Kobayashi, Mitsuo; and Shirai, Akira, 4,685,180, Cl. 29-33.00R.

Nippon Soken, Inc.: *See—*
Kamiya, Sigeru; Kojima, Akikazu; and Sakakibara, Yasuyuki, 4,685,290, Cl. 60-274.000.

Nippon Steel Corporation: *See—*
Aoyagi, Koshiro; Nishino, Taneharu; and Betsuki, Kenji, 4,685,319, Cl. 72-234.000.
Mure, Hiroshi; Mizoguchi, Ryohei; Yokoi, Shinichi; Fujihara, Shigeru; and Ichikawa, Kaoru, 4,686,687, Cl. 373-22.000.
Sato, Takashi; and Yamada, Toshio, 4,685,980, Cl. 148-304.000.
Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, 4,686,081, Cl. 420-29.000.

Nippon Telegraph & Telephone Public Corporation: *See*—
Fujii, Tsuneo; Inukai, Hiroshi; Deguchi, Takayuki; Amano, Toshihiko; Kakuchi, Masami; Asakawa, Hiroshi; and Kogure, Osamu, 4,686,168, Cl. 430-326.000.

Nippondenso Co., Ltd.: *See*—
Otsuki, Hiromi; Matsuura, Ryoichi; Fujinami, Hiroshi; Hori, Shinichi; Nomura, Yoshihisa; and Oka, Hiroyuki, 4,685,749, Cl. 303-116.000.
Ueda, Masahiro; Hakamata, Kohei; and Tsuchiya, Seigo, 4,685,318, Cl. 72-185.000.

Nippondenso Kabushiki Kaisha: *See*—
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.

Nishi, Tatsunari: *See*—
Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, 4,686,191, Cl. 435-320.000.

Nishi, Toshiro; Murakami, Nobuaki; Ueda, Kenji; Shirakawa, Seiichi; Notomi, Akira; Hisamatsu, Kenichi; and Kaneko, Shozo, to Mitsubishi Jukogyo Kabushiki Kaisha. Solid electrolyte fuel cell and method for preparing it. 4,686,158, Cl. 429-26.000.

Nishi, Yasuhiko: *See*—
Nomura, Hirokazu; Sato, Yukihiko; Nishi, Yasuhiko; Higurashi, Mizuho; and Mori, Saburo, 4,686,341, Cl. 219-54.000.

Nishihara, Kazue: *See*—
Wada, Mitsuo; and Nishihara, Kazue, 4,685,349, Cl. 74-479.000.

Nishimura, Shinji; Wada, Hifumi; and Komurasaki, Keiichi, to Mitsubishi Denki Kabushiki Kaisha. Power generation control apparatus for alternating current generator. 4,686,446, Cl. 322-33.000.

Nishimura, Yasufumi: *See*—
Wakunaga, Manji; and Nishimura, Yasufumi, 4,686,185, Cl. 435-206.000.

Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, to Canon Kabushiki Kaisha. Optical device. 4,685,766, Cl. 350-96.320.

Nishimuta, Kouichi; Izumi, Kazuo; and Shinsugi, Kazue, to Sumitomo Chemical Company, Ltd. Tobacco axillary bud regulating composition. 4,685,951, Cl. 71-78.000.

Nishino, Taneharu: *See*—
Aoyagi, Koshiro; Nishino, Taneharu; and Betsuki, Kenji, 4,685,319, Cl. 72-234.000.

Nishioka, Masato: *See*—
Miyake, Yasuo; Tajima, Osamu; Nishioka, Masato; and Itoh, Yasuhiko, 4,686,157, Cl. 429-19.000.

Nishiwaki, Yoshikazu: *See*—
Tada, Kunio; Nishiwaki, Yoshikazu; and Matsuoka, Shunji, 4,685,763, Cl. 350-96.140.

Nishizawa, Jun-ichi. Method of manufacturing a group II-VI compound semiconductor device having a pn junction. 4,685,979, Cl. 437-81.000.

Nishizawa, Jun-ichi: *See*—
Yusa, Atsushi; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,686,555, Cl. 357-30.000.

Nissan Motor Co., Ltd.: *See*—
Abo, Toshimi; Ueno, Takashi; and Sumizawa, Akio, 4,685,302, Cl. 60-602.000.
Kondo, Nobuaki, 4,685,716, Cl. 296-63.000.
Kuroki, Junsuke; and Sugasawa, Fukashi, 4,686,626, Cl. 364-426.000.
Matsuda, Toshiro, 4,685,746, Cl. 303-106.000.
Mihara, Teruyoshi, 4,686,551, Cl. 357-23.400.

Niwa, Hitoshi: *See*—
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.

Niwa, Shigeo; Kondo, Kazuo; and Betsuki, Katsutoshi, to NGK Spark Plug Co., Ltd. Artificial joint. 4,685,919, Cl. 623-21.000.

Niwa, Toshiaki, to Honda Giken Kogyo Kabushiki Kaisha. Sliding roof for vehicles. 4,685,724, Cl. 296-216.000.

Niwa, Toshio; and Katoh, Yoshiaki, to Mitsubishi Chemical Industries Limited. Disazo reactive dyestuffs for cellulose fibers. 4,686,286, Cl. 534-637.000.

NL Industries, Inc.: *See*—
Davison, Francis L., 4,686,658, Cl. 367-85.000.
House, Roy F.; and Hoover, Lonnie D., 4,686,051, Cl. 252-8.551.

Noda, Akio: *See*—
Yanazawa, Tadaaki; Tanaka, Teruaki; Noda, Akio; Takeda, Ryo; and Inoue, Masataka, 4,685,320, Cl. 72-250.000.

Noda, Yasushi: *See*—
Kashiwagi, Yoshiyuki; Noda, Yasushi; and Kitakizaki, Kaoru, 4,686,338, Cl. 200-264.000.

Noel, Didier: *See*—
Veysset, Jean-Paul; Camp, Jean-Jacques; and Noel, Didier, 4,686,067, Cl. 252-626.000.

Noel, Vincent R.; and Van Shoubroek, Fred B., to McDonnell Douglas Corporation. Separation system. 4,685,376, Cl. 89-1.140.

Nogami, Takahiro: *See*—
Ohashi, Kaoru; Kobayashi, Ikuya; Nogami, Takahiro; Shirai, Akira; Nakamura, Kazumasa; and Nomura, Yoshihisa, 4,685,547, Cl. 192-3.00R.

Noguchi, Hiroshi: *See*—
Takahashi, Junya; Sasaki, Mitsuru; Noguchi, Hiroshi; and Kato, Toshiro, 4,686,232, Cl. 514-365.000.
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.

Noji, Takashi, to Kabushiki Kaisha Toshiba. X-ray image intensifier. 4,686,417, Cl. 313-479.000.

Nojima, Kazuhiro; Shono, Kouichi; and Takahashi, Mikio, to Kanzaki Paper Mfg. Co., Ltd. Method of producing cast coated paper. 4,686,119, Cl. 427-362.000.

Nollet, Andreas J. H.; Meijer, John; and Overkamp, Johannes W. A., to Akzo NV. P-sulphophenyl carbonates and detergent compositions and detergent additives containing these compounds. 4,686,061, Cl. 252-95.000.

Noma, Takashi: *See*—
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.

Nomura, Etsuji: *See*—
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.

Nomura, Hirokazu; Sato, Yukihiko; Nishi, Yasuhiko; Higurashi, Mizuho; and Mori, Saburo, to Nippon Kokan Kabushiki Kaisha; and Nippon Kokan Koji Kabushiki Kaisha. Gas shield chamber for arc welding of rails. 4,686,341, Cl. 219-54.000.

Nomura, Noboru: *See*—
Kawakita, Kenji; Nomura, Noboru; and Takemoto, Toyoki, 4,685,198, Cl. 437-73.000.

Nomura, Takeshi: *See*—
Maruyama, Kouji; Nomura, Takeshi; Ueno, Hiroshi; and Inaba, Naomi, 4,686,265, Cl. 526-125.000.

Nomura, Yoshihisa: *See*—
Ohashi, Kaoru; Kobayashi, Ikuya; Nogami, Takahiro; Shirai, Akira; Nakamura, Kazumasa; and Nomura, Yoshihisa, 4,685,547, Cl. 192-3.00R.
Otsuki, Hiromi; Matsuura, Ryoichi; Fujinami, Hiroshi; Hori, Shinichi; Nomura, Yoshihisa; and Oka, Hiroyuki, 4,685,749, Cl. 303-116.000.

Noon, Kelly D. Disposable beverage cup handle. 4,685,583, Cl. 220-94.00R.

Nordqvist, Percy, deceased: *See*—
Agren, Magnus; and Nordqvist, Percy, deceased, 4,685,907, Cl. 604-304.000.

Nordqvist, Ulla, Per Nordquist, Patrik Nordqvist, heirs: *See*—
Agren, Magnus; and Nordqvist, Percy, deceased, 4,685,907, Cl. 604-304.000.

North American Philips Corporation: *See*—
White, Roger P., 4,686,524, Cl. 340-787.000.

North, Arthur J.: *See*—
Liptak, Frank J., Jr.; and North, Arthur J., 4,686,514, Cl. 340-571.000.

North Carolina State University: *See*—
Law, S. Edward; and Bowen, Henry D., 4,685,620, Cl. 239-3.000.

Northern Technologies, Ltd.: *See*—
Dickie, Robert G.; and Hobbins, Martin E., 4,686,576, Cl. 358-245.000.

Northern Telecom Limited: *See*—
Syrett, Barry A.; and Kennard, Paul A., 4,686,496, Cl. 333-202.000.
Zuber, Bretislav P., 4,685,711, Cl. 294-86.410.

Northrop Corporation: *See*—
Rickborn, Steven F.; and Rogers, Donald Z., 4,686,116, Cl. 427-215.000.

Northwestern University: *See*—
Childress, Dudley; and Strysik, John, 4,685,925, Cl. 623-25.000.

Norvall, Christopher W.: *See*—
Ridler, Keith D.; Taylor, Peter J.; Poley, John; Norvall, Christopher W.; and Upton, John, 4,685,475, Cl. 131-84.100.

Nosaka, Yoshifumi: *See*—
Iriuchijima, Shinobu; Kobayashi, Hirohiko; Aoki, Kyoji; Oda, Takeshi; Shinoyama, Masayuki; and Nosaka, Yoshifumi, 4,686,296, Cl. 548-544.000.

Noto, Richard; and Smith, David C., to RCA Corporation. Logic cell placement method in computer-aided-customization of universal arrays and resulting integrated circuit. 4,686,629, Cl. 364-491.000.

Notomi, Akira: *See*—
Nishi, Toshiro; Murakami, Nobuaki; Ueda, Kenji; Shirakawa, Seiichi; Notomi, Akira; Hisamatsu, Kenichi; and Kaneko, Shozo, 4,686,158, Cl. 429-26.000.

Nouvelle, Robert; and Segura, Jean L., to Dauphinoise Thomson. Thermostatic control devices. 4,685,651, Cl. 251-11.000.

Novak, Robert F.; and Weber, Neill, to Ford Motor Company. Electronically and ionically conducting electrodes for thermoelectric generators. 4,686,320, Cl. 136-239.000.

Novo, Juan. Musical instrument. 4,685,373, Cl. 84-464.00A.

NTN Toyo Bearing Co., Ltd.: *See*—
Nakazeki, Tsugito; Nanami, Shoji; and Okada, Koichi, 4,686,404, Cl. 310-90.500.

Nuckolls, Joe A.; and Evans, Kerry G., to Harvey Hubbell Incorporated. Emergency lighting circuits. 4,686,424, Cl. 315-86.000.

Nuclear Energy Services, Inc.: *See*—
Zwart, Bernardus M., Jr., 4,686,078, Cl. 376-249.000.

N.V. Nederlandsche Apparatenfabriek NEDAP: *See*—
Fockens, Tallienco W. H., 4,686,517, Cl. 340-572.000.

Nystrom, Norman A. Propeller driven tunnel boat. 4,685,889, Cl. 440-69.000.

Oakes, Grant A. Method of rebuilding a strip mill guide. 4,686,345, Cl. 219-76.140.

Oakland Corporation, The: *See*—
Wallace, Richard B., 4,686,272, Cl. 528-87.000.

Oba, Hidehiro, to Toyota Jidosha Kabushiki Kaisha. Fuel injection control device for internal combustion engine. 4,685,436, Cl. 123-492.000.

Obara, Keishi: *See*—
Saida, Toyoyasu; Sunagawa, Takahisa; Yamakawa, Tsuneo; Ohta, Norima; and Obara, Keishi, 4,686,068, Cl. 252-632.000.

Obayashi, Tsutomu; Ino, Kazuhide; Hiraoka, Yoshiji; and Baba, Saburo, to Hiraoka & Co., Ltd. Composite sheet material. 4,686,135, Cl. 428-265.000.

Oberdorf, Manfred, to Maschinerfabrik Alfred Schmermund GmbH & Co. Ejection method and apparatus. 4,685,554, Cl. 198-468.600.

Oberman, Carl D.: *See*—
Hoffman, Norman E.; and Oberman, Carl D., 4,686,333, Cl. 200-6.00B.

Obi, Hideo: *See*—
Kojima, Shigeru; and Obi, Hideo, 4,686,434, Cl. 318-52.000.

O'Connor, Dermot J., to Data Recording Instrument Company Limited. Bush securing mechanism. 4,685,172, Cl. 16-2.000.

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Cadee, Theodorus P. M.; Van der Veen, Siebren C.; and Fluks, Marten, 4,685,353, Cl. 74-689.000.

Oculus Optikgeraete GmbH: *See*—
Kirchhuebel, Rainer, 4,685,784, Cl. 351-226.000.

Oda, Takeshi: *See*—
Iriuchijima, Shinobu; Kobayashi, Hirohiko; Aoki, Kyoji; Oda, Takeshi; Shinoyama, Masayuki; and Nosaka, Yoshifumi, 4,686,296, Cl. 548-544.000.

Oda, Yoshio; Asawa, Tatsuro; Sato, Kimihiko; and Sajima, Yasuo, to Asahi Glass Company Ltd. Method of installation of membrane to electrolytic cell. 4,686,026, Cl. 204-252.000.

Oenema, Rinke: *See*—
Middel, Roelof G.; and Oenema, Rinke, 4,685,422, Cl. 119-14.130.

Oetiker, Hans. Hospital bed. 4,685,159, Cl. 5-61.000.

Officina Meccanica Fratelli Falzoni S.d.f.: *See*—
Falzoni, Pierino, 4,685,604, Cl. 227-18.000.

Ogawa, Masao: *See*—
Fujita, Haruyasu; Ogawa, Masao; and Suzuki, Takahisa, 4,685,690, Cl. 280-112.00A.

Ogawa, Tadashi; and Okazaki, Masaki, to Fuji Photo Film Co., Ltd. Silver halide multi-layered color photographic light sensitive material. 4,686,175, Cl. 430-505.000.

Ogura, Ken, to Oki Electric Industry Co., Ltd. Positive type resist material with trimethylsilylnitrile. 4,686,280, Cl. 430-190.000.

Ogura, Yoshio: *See*—
Tominaga, Haruo; Takayama, Teruyuki; Ogura, Yoshio; and Yamaguchi, Tetsuo, 4,686,153, Cl. 428-610.000.

O'Hara, Gerald J.: *See*—
Ritchey, Mary B.; Cano, Francis R.; O'Hara, Gerald J.; English, James D.; and Lin, Wenlii, 4,686,102, Cl. 424-92.000.

Ohara Paragium Chemical Co., Ltd.: *See*—
Yosida, Ethuo, 4,686,247, Cl. 523-213.000.

Ohashi, Kaoru; Kobayashi, Ikuya; Nogami, Takahiro; Shirai, Akira; Nakamura, Kazumasa; and Nomura, Yoshihisa, to Toyota Jidosha Kabushiki Kaisha. Wheel slip controlling system. 4,685,547, Cl. 192-3.00R.

Ohba, Hisao: *See*—
Nakanishi, Haruo; Ohba, Hisao; and Sakaki, Hirokazu, 4,686,021, Cl. 204-129.750.

Ohba, Toshihiro: *See*—
Fujioka, Yoshihide; Harada, Shigeyuki; Ohba, Toshihiro; Kanatani, Yoshiharu; and Uede, Hisashi, 4,686,426, Cl. 315-169.300.

Ohe, Takeshi; Taniguchi, Yoshiaki; and Arai, Minoru, to Jidosha Kiki Co., Ltd. Electric power steering apparatus. 4,686,438, Cl. 318-280.000.

Ohkubo, Masahiro, to Kabushiki Kaisha Daikin Seisakusho. Power distributing mechanism. 4,685,352, Cl. 74-665.0GA.

Ohmi, Tadahiro; and Tanaka, Nobuyoshi, to Canon Kabushiki Kaisha. Photoelectric converter. 4,686,554, Cl. 357-30.000.

Ohnari, Eiji, to Eikoh Giken Co., Ltd. No-break power supply system. 4,686,379, Cl. 307-66.000.

Ohnsorge, Horst, to Standard Electrik Lorenz AG. Broadband integrated subscriber loop system. 4,686,667, Cl. 370-4.000.

Ohsawa, Takashi: *See*—
Furuyama, Tohru; and Ohsawa, Takashi, 4,686,456, Cl. 324-73.00R.

Ohta, Haruo: *See*—
Tomita, Masao; Hashima, Akio; Ohta, Haruo; and Matsuo, Tadaaki, 4,686,583, Cl. 358-336.000.

Ohta, Masaki: *See*—
Takenaka, Kenji; Ohta, Masaki; and Kayukawa, Hiroaki, 4,685,866, Cl. 417-222.000.

Ohta, Norima: *See*—
Saida, Toyoyasu; Sunagawa, Takahisa; Yamakawa, Tsuneo; Ohta, Norima; and Obara, Keishi, 4,686,068, Cl. 252-632.000.

Ohta, Takeshi; Nakamura, Hiroshi; and Murata, Kazushi, to Toyoda Koki Kabushiki Kaisha. Tool and workpiece change system. 4,685,850, Cl. 414-225.000.

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Buxton, James L.; Phillips, Alan C.; and Honey, Stanley K., 4,686,642, Cl. 364-607.000.

Phillips, Asa R.: *See—*
Steenblik, Richard A.; Phillips, Asa R.; Mamay, Daniel P.; Denson, Lawrence K.; Tucker, Richard A.; and Clark, Jimmy M., 4,685,718, Cl. 296-154.000.

Phillips, Charles E., to Textron Inc. Voltage regulator for lawn mower engine battery charger. 4,686,445, Cl. 320-61.000.

Phillips Petroleum Company: *See—*
Bresson, Clarence R.; Parlman, Robert M.; and Kimble, James B., 4,686,033, Cl. 209-167.000.
Brock, Timothy A., 4,685,703, Cl. 285-47.000.
Porter, Randall A.; and Reed, Larry E., 4,686,201, Cl. 502-154.000.
Rowe, Fred, 4,686,086, Cl. 422-111.000.

Phounsombath, Sing K.: *See—*
Palmier, Rene G.; Perrier, Pierre P.; and Phounsombath, Sing K., 4,686,501, Cl. 335-256.000.

Picard, Bernard, to Commissariat a l'Energie Atomique. Optical microlithography apparatus with a local alignment system. 4,685,807, Cl. 356-401.000.

Pichat, Alfred, to General Signal Corporation. Fluid flow sensor. 4,686,450, Cl. 323-282.000.

Picker, Franck, to Scientific Ecology Group, Inc., The. Remotely controlled multishaped container compacting press. 4,685,391, Cl. 100-242.000.

Picker International Inc.: *See—*
DeMeester, Gordon D.; and Mattson, Rodney A., 4,686,692, Cl. 378-4.000.

Piesik, Edward T., to General Dynamics, Pomona Division. Exhaust dissipator device. 4,685,533, Cl. 181-213.000.

Pilsak, Manfred: *See*—
Block, Werner; Pabst, Wolfgang; and Pilsak, Manfred, 4,686,419, Cl. 313-641.000.

Pinto, Albert A., to Nabisco Brands. High volume dough piece production apparatus. 4,685,878, Cl. 425-202.000.

Pioneer Electronic Corporation: *See*—
Iwasaki, Hideki; Yokokawa, Tomohisa; and Kurosaki, Masanori, 4,686,707, Cl. 455-200.000.

Piotrowski, Krzysztof: *See*—
Dziewanowski, Andre ; Piotrowski, Krzysztof; and Zaremba, Krzysztof, 4,686,075, Cl. 264-209.200.

Pirelli S/A Companhia Industrial Brasileira: *See*—
Pellini, Renzo, 4,685,633, Cl. 242-85.000.

Pisczak, Philip J.: *See*—
Branc, Joseph R.; Merchant, Thomas J.; Miller, William L.; and Pisczak, Philip J., 4,685,303, Cl. 62-3.000.

Pitney Bowes Inc.: *See*—
Hafner, Warren G., 4,686,388, Cl. 307-296.00R.

Pitowski, Hans-Jurgen: *See*—
Behnke, Joachim; and Pitowski, Hans-Jurgen, 4,686,044, Cl. 210-500.220.

Pitsch, Daniel M., to ADC Telecommunications, Inc. Terminal assembly. 4,685,755, Cl. 439-404.000.

Pittway Corporation: *See*—
Kremer, Leon V.; and Kieras, Ronald E., 4,685,820, Cl. 401-260.000.

Pizzigoni, Giuseppe; and Parrini, Paolo, to Larac S.p.A. Composition for the desulphatizing cleaning of carbonatic stone surfaces. 4,686,064, Cl. 252-153.000.

Plater, Michael G.; Middleton, Kenneth; and Jackson, David B., to Hollybank Engineering Company Limited. Fishplate. 4,685,839, Cl. 405-288.000.

Plepys, Raymond A.: *See*—
Turner, Robert B.; Peffley, Richard D.; Plepys, Raymond A.; Priester, Ralph D.; Gonzales, Manuel, Jr.; and Bushman, Kimbley A., 4,686,242, Cl. 521-137.000.

Plessey Company P.L.C., The: *See*—
Heller, Harold H.; Oliver, Stephen N.; Whittal, John; Johncock, William; Darcy, Paul J.; and Trundle, Clive, 4,685,783, Cl. 351-163.000.

Plessey Overseas Limited: *See*—
Attenborough, Colin, 4,686,488, Cl. 331-2.000.

PMT Corporation: *See*—
Iversen, Alfred A.; Eastman, William J.; and Van Beek, Allen L., 4,685,447, Cl. 128-1.00R.

Pneumo Corporation: *See*—
Benton, Terry L., 4,685,589, Cl. 220-465.000.
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,685,384, Cl. 92-166.000.

Pohl, Claus: *See*—
Mundt, Peter; Neuhold, Arnold; and Pohl, Claus, 4,685,785, Cl. 353-120.000.

Poirier, Arthur L.: *See*—
MacDonald, Robert I.; Hara, Elmer H.; and Poirier, Arthur L., 4,686,533, Cl. 342-373.000.

Polaroid Corporation: *See*—
Falzone, Timothy F.; and Schettino, Anthony J., 4,685,791, Cl. 354-277.000.

Poley, John: *See*—
Ridler, Keith D.; Taylor, Peter J.; Poley, John; Norvall, Christopher W.; and Upton, John, 4,685,475, Cl. 131-84.100.

Pollard, Geoffrey J.; and Baker, Roger C., to British Hydromechanics Research Association, The. Non-intrusive mixing of fluid. 4,685,811, Cl. 366-275.000.

Pollock, David B. Process for nuclear hardening optics and product produced thereby. 4,685,778, Cl. 350-600.000.

Polymer Technology Corporation: *See*—
Ellis, Edward J.; and Ellis, Jeanne Y., 4,686,267, Cl. 526-245.000.

Ponce, Felix C. Reciprocating sander. 4,685,252, Cl. 51-170.0TL.

Porter, Randall A.; and Reed, Larry E., to Phillips Petroleum Company. Antifoulants comprising tin antimony and aluminum for thermal cracking processes. 4,686,201, Cl. 502-154.000.

Posey, John T., to J. T. Posey Company. Sleeve jacket restraining device. 4,685,454, Cl. 128-134.000.

Possin, George E., to General Electric Company. Low capacitance amorphous silicon field effect transistor structure. 4,686,553, Cl. 357-23.700.

Power Group International Corp.: *See*—
Gottfried, Carlos F., 4,686,375, Cl. 290-2.000.

Powers, Carol C.; and Lare, Donald W., to Avery International Corporation. Image transfer method. 4,685,984, Cl. 156-155.000.

Powers, Steven J., to Murray, Fred R., Jr.; Guy, W. W.; and Arnold, G., part interest to each. Rescue axe. 4,685,213, Cl. 30-123.000.

PPG Industries, Inc.: *See*—
Tang, Robert H., 4,686,266, Cl. 526-193.000.

Preh Elektrofeinmechanische Werke Jakob Preh Nacht. GmbH & Co.: *See*—
Bauer, Karl-Heinz; and Fick, Heinz, 4,685,350, Cl. 74-500.00R.

Prentakis, Antonios E.: *See*—
Goodman, Frederick A.; and Prentakis, Antonios E., 4,685,775, Cl. 350-486.000.

Prevot, Claude: *See*—
Chesneau, Rene ; and Prevot, Claude, 4,686,473, Cl. 324-320.000.

Price, Anthony G.; and Campbell, Roy, to Lucas Industries. Self-energizing disc brakes. 4,685,541, Cl. 188-71.400.

Priem, Richard J.; Ghassemzadeh, M. Reza; and Griffiths, James C., to American Gas Association. Pulse combustion engine and heat transfer system. 4,685,510, Cl. 165-62.000.

Prier, Donald G.: *See*—
Harris, Robert F.; and Prier, Donald G., 4,686,274, Cl. 528-196.000.

Priester, Ralph D.: *See*—
Turner, Robert B.; Peffley, Richard D.; Plepys, Raymond A.; Priester, Ralph D.; Gonzales, Manuel, Jr.; and Bushman, Kimbley A., 4,686,242, Cl. 521-137.000.

Priestley, Joseph B., Jr. Filtration apparatus. 4,685,943, Cl. 55-400.000.

Prilik, Ronald J., to International Business Machines Corporation. Fast recovery power supply. 4,686,462, Cl. 324-158.00R.

Prince Corporation: *See*—
Dykstra, Ronald A.; Hawks, Mark W.; and De Jong, Jerry M., 4,686,609, Cl. 362-61.000.

Principi, Fabio: *See*—
Armstrong, Bruce G.; and Principi, Fabio, 4,686,651, Cl. 365-226.000.

Pringle, David A.; and Gourley, Helen, to Optech Inc. Lamp reflector assembly. 4,686,612, Cl. 362-297.000.

Printronix, Inc.: *See*—
Kazarian, Sam; Hagene, Steffen D.; McCrimmon, Kenneth A., Jr.; Miller, Robert C.; and Schwerin, James A., 4,685,818, Cl. 400-249.000.

Printware, Inc.: *See*—
Schoon, David J., 4,686,363, Cl. 250-235.000.

Process Systems, Inc.: *See*—
Marsland, Charles N.; and Jannelli, Ralph J., 4,686,630, Cl. 364-492.000.

Procter & Gamble Company, The: *See*—
Berg, Ronald W.; and Stewart, Robert L., 4,685,909, Cl. 604-360.000.
Burns, Michael E., 4,686,063, Cl. 252-102.000.
Crabtree, Paul J.; and Imakawa, Kazuhiko, 4,686,060, Cl. 252-90.000.
Hasse, Margaret H.; and Steinhardt, Mark J., 4,685,915, Cl. 604-378.000.
Kermode, Nigel J.; and Bragg, Charles D., 4,686,062, Cl. 252-99.000.

Procter-Gregg, H. David: *See*—
Kober, Carl L.; and Procter-Gregg, H. David, 4,686,475, Cl. 324-349.000.

Professional Care Products, Inc.: *See*—
Austin, Gerald W., 4,685,913, Cl. 604-349.000.

Propst, Larry D.: *See*—
Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.

Pryor, Timothy R.: *See*—
Liptay-Wagner, Nicholas; Renaud, Roland; Pryor, Timothy R.; and Clarke, Donald A., 4,686,374, Cl. 250-571.000.

Pugh, Calvin H. Trotline reel and hook holder. 4,685,243, Cl. 43-57.300.

Puhler, Alfred; and Simon, Reinhard, to Lubrizol Genetics, Inc. Gene transfer vector. 4,686,184, Cl. 435-172.300.

Pulciani, Sam C.; and Szczerba, Robert M., to National Can Corporation. Container profile with stacking feature. 4,685,582, Cl. 220-66.000.

Purstinger, Franz; and Topf, Siegfried. Calibrator for extruded material. 4,685,879, Cl. 425-383.000.

Pusey, Donald K.: *See*—
Fountain, Frank S.; and Pusey, Donald K., 4,686,563, Cl. 360-38.100.

Pyles, Robert A.; and Mulvey, Patrick J., to General Electric Company. Process for separating cyclic oligomeric dihydric phenol carbonate from aromatic polycarbonate. 4,686,046, Cl. 210-651.000.

Pyles, Robert A.: *See*—
Howery, Richard W.; Rosenquist, Niles R.; Pyles, Robert A.; and Mulvey, Patrick J., 4,686,277, Cl. 528-493.000.

Quadrex HPS, Inc.: *See*—
Fowler, David E., 4,685,972, Cl. 134-12.000.

Quann, Richard J.; and Tabak, Samuel A., to Mobil Oil Corporation. Process for removing oxygenated compounds or other impurities from hydrocarbon streams. 4,686,317, Cl. 585-860.000.

Quillen, Jeffrey B.; and Spahn, James G. Recliner for medical convalescence. 4,685,163, Cl. 5-455.000.

Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., to Thomson Components - Mostek Corp. Process of forming integrated circuits with contact pads in a standard array. 4,685,998, Cl. 156-633.000.

Qureshi, Shahid P., to Amoco Corporation. Moisture resistant, wet winding epoxy resin system containing aromatic diamines. 4,686,250, Cl. 523-440.000.

R.F.D. Limited: *See*—
Edwards, David V., 4,685,890, Cl. 441-94.000.

R. R. Brink Locking Systems, Inc.: *See*—
Kambic, Raymond V., 4,685,709, Cl. 292-201.000.

Rabo, Jule A.: *See*—
Pellet, Regis J.; Gortsema, Frank P.; Long, Gary N.; and Rabo, Jule A., 4,686,029, Cl. 208-111.000.

Radice, Marco: *See*—
Palla, Ottorino; Gozzo, Franco; and Radice, Marco, 4,685,954, Cl. 71-90.000.

Radiometer A/S: *See*—
Engell, John E.; and Mortensen, Svend, 4,686,012, Cl. 204-1.00T.

Klitgaard, Peter C.; and Pedersen, Knud G., 4,685,465, Cl. 128-635.000.
Radomski, Thomas A., to General Motors Corporation. Dual voltage electrical system. 4,686,442, Cl. 320-17.000.
Radovsky, Jonathan S., to Commodore Business Machines, Inc. Current mirror amplifier. 4,686,487, Cl. 330-288.000.
Raffin, Thomas A.; and Stevens, John H., to Leland Stanford Junior University, The Board of Trustees of the. Method for the treatment of adult respiratory distress syndrome. 4,686,100, Cl. 424-85.000.
Rainer, Georg; Figala, Volker; and Kohl, Bernhard, to Byk Gulden Lomberg Chemische Fabrik GmbH. Picoline derivative useful as gastric acid secretion inhibitors. 4,686,230, Cl. 514-338.000.
Rajotte, Paul T.: *See*—
Morris, Robert A.; and Rajotte, Paul T., 4,686,600, Cl. 361-42.000.
Ralph McKay Limited: *See*—
Young, Hartley F., 4,685,618, Cl. 238-310.000.
Ralston Purina Company: *See*—
Betz, Norman L.; and Degoey, Larry W., 4,686,205, Cl. 514-25.000.
Ramsey Engineering Company: *See*—
Berry, Peter F.; Miller, Wendell D.; and Nethery, John L., Jr., 4,686,694, Cl. 378-120.000.
Ranganayaki, Rambabu P., to Mobil Oil Corporation. Plotting of magnetotelluric impedance to determine structure and resistivity variation of anomalies. 4,686,476, Cl. 324-350.000.
Rao, Chennupati K.; and D'Silva, Themistocles D., to Union Carbide Corporation. Pesticidal water-soluble aminoacid sulfenylated carbamates. 4,686,233, Cl. 514-469.000.
Rapitech Systems Inc.: *See*—
Farago, Steven, 4,686,506, Cl. 340-347.0DD.
Rascov, Anthony J. Mailbox indicator. 4,685,612, Cl. 232-35.000.
Rast, Robert M.: *See*—
Masuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, 4,686,564, Cl. 358-86.000.
Rastelli, Agostino A., to Leitner Corporation. Food preparation table having a refrigerated ingredient zone. 4,685,311, Cl. 62-258.000.
Rath, Heinrich B.; and Schemmel, Winfried, to Lucas Industries public limited company. Signal transmitter for monitoring a brake lining. 4,685,540, Cl. 188-1.110.
Rathgeb, Paul: *See*—
Hoegerle, Karl; Cellarius, Hans J.; Rathgeb, Paul; and Rumpf, Jurg, 4,686,294, Cl. 548-140.000.
Rau, Gunter. Measuring sensor for the non-invasive detection of electro-physiological quantities. 4,685,466, Cl. 128-639.000.
Raudenbusch, Werner T.: *See*—
Bekooij, Jurrianus; Kooijmans, Petrus G.; Raudenbusch, Werner T.; and Stachowiak, Stephen A., 4,686,248, Cl. 523-404.000.
Rauf, Richard: *See*—
Pav, Josef; Wenzel, Reinhard; Svenka, Peter; and Rauf, Richard, 4,685,390, Cl. 100-168.000.
Raulins, George M. Well apparatus. 4,685,521, Cl. 166-341.000.
Raychem Corporation: *See*—
Debbaut, Christian A. M.; Shimirak, Gerald L.; and Swinmurn, John C., 4,686,327, Cl. 174-88.00R.
Gamarra, Jose P., 4,685,756, Cl. 439-426.000.
Hall, Robert L.; Franckx, Joris R. I.; Overbergh, Noel M. M.; Doucet, Jos; and Vansant, Jan, 4,685,683, Cl. 277-1.000.
Rosenzweig, Nachum; and Skanderup, Ken W., 4,686,071, Cl. 264-27.000.
Raytheon Company: *See*—
Armstrong, Bruce G.; and Principi, Fabio, 4,686,651, Cl. 365-226.000.
Gentilman, Richard L., 4,686,128, Cl. 428-44.000.
Maguire, Edward A.; Hartnett, Thomas M.; and Gentilman, Richard L., 4,686,070, Cl. 264-1.200.
RCA Corporation: *See*—
Balaban, Alvin R.; Patel, Chandrakant B.; Demmer, Walter H.; and Harwood, Leopold A., 4,686,560, Cl. 358-19.000.
Campbell, Edward R., III; and Lewis, Henry G., Jr., 4,686,569, Cl. 358-167.000.
Colton, Robert M., 4,686,617, Cl. 363-56.000.
Erhardt, Harry G., 4,686,574, Cl. 358-213.260.
Harwood, Leopold A.; Wargo, Robert A.; and Patel, Chandrakant B., 4,686,561, Cl. 358-31.000.
Hoffman, Dorothy M., 4,686,112, Cl. 427-42.000.
Jastrzebski, Lubomir L., 4,685,199, Cl. 437-54.000.
Jennings, James R., Jr., 4,686,430, Cl. 315-371.000.
Johnston, Ross W., 4,686,597, Cl. 360-130.230.
Kujas, Erich F., 4,685,608, Cl. 228-227.000.
Kujas, Erich F., 4,686,322, Cl. 136-245.000.
Lewis, Henry G., Jr.; and Ng, Sheau-Bao, 4,686,570, Cl. 358-188.000.
Noto, Richard; and Smith, David C., 4,686,629, Cl. 364-491.000.
Talley, Eric; and Gounder, Raj N., 4,686,150, Cl. 428-593.000.
Read, Arthur E., Jr.: *See*—
Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., 4,686,314, Cl. 585-260.000.
Reber, Walter, to Kuhn, S.A. Hay spreader. 4,685,281, Cl. 56-370.000.
Reberle reg. Treuunternehmen Schaan: *See*—
Gisler, Hans; and Boschung, Marcel, 4,685,228, Cl. 37-197.000.
Rebollo, Juan G. Self-contained outdoor sports event seat. 4,685,728, Cl. 297-184.000.
Redikultsev, Jury V.; Litvinenko, Leonid A.; Golovlev, Evgeny L.; Golovleva, Ljudmila A.; Chermensky, Dmitry N.; and Skryabin, Georgy K. Apparatus for bioconversion of vegetal raw material. 4,686,189, Cl. 435-289.000.
Reed, Larry E.: *See*—
Porter, Randall A.; and Reed, Larry E., 4,686,201, Cl. 502-154.000.
Regas, Jennine; and Fernando, Ranjit S., to Zetek, Inc. Method and apparatus for predicting and detecting the onset of ovulation. 4,685,471, Cl. 128-734.000.
Rei, Nuno M., to Morton Thiokol, Inc. Solid biocide dry blend. 4,686,239, Cl. 521-55.000.
Reich, Ronald K.: *See*—
Anderson, Philip M.; and Reich, Ronald K., 4,685,234, Cl. 40-625.000.
Reilly, Theresa A.: *See*—
Dellinger, J. A.; Goins, Neal R.; and Reilly, Theresa A., 4,686,657, Cl. 367-75.000.
Reimers, Eric W. Golf bag device. 4,685,561, Cl. 206-315.600.
Reinecke, Erich, to WABCO Westinghouse Fahrzeugbremsen GmbH. Motor vehicle brake pressure-regulating apparatus. 4,685,745, Cl. 303-100.000.
Reis, Oswald: *See*—
Brunken, Gerd; Gob, Werner; and Reis, Oswald, 4,685,549, Cl. 192-58.00B.
Reliance Universal, Inc.: *See*—
Nason, Dale L.; and Gray, Richard L., 4,686,108, Cl. 427-27.000.
Rempt, Raymond D., to Boeing Company, The. Method and apparatus for producing a monatomic beam of ground-state atoms. 4,686,022, Cl. 204-157.410.
Renaud, Roland: *See*—
Liptay-Wagner, Nicholas; Renaud, Roland; Pryor, Timothy R.; and Clarke, Donald A., 4,686,374, Cl. 250-571.000.
Renken, Wayne G.; LeMay, Dan B.; and Takahashi, Ricardo M., to Innovus. Thermal mass flowmeter and controller. 4,685,331, Cl. 73-204.000.
Renner, Karl H.; and Morton, Alec J., to Texas Instruments Incorporated. Linear predictive coding technique with symmetrical calculation of Y-and B-values. 4,686,644, Cl. 364-724.000.
Research Foundation of State University of New York, The: *See*—
Cramer, Eva B.; Milks, Linda C.; Conyers, Gregory P.; Valenti, Andrew; and Perez, Antonio, 4,686,190, Cl. 435-291.000.
Resnick, Bruce M.; and Wexler, Allan J., to Anitec Image Corporation. Compositions comprising ethane dioic acid hydrazide compounds and derivatives useful as dot-promoting agents. 4,686,167, Cl. 430-264.000.
Retz, Philip. Tide turbine. 4,686,376, Cl. 290-42.000.
Reuschel, Donald L. Cartridge carrier and dispenser. 4,685,600, Cl. 224-203.000.
Revell, William J.: *See*—
Collins, Ian P.; and Revell, William J., 4,685,450, Cl. 128-4.000.
Rhodes, Charles R.: *See*—
Cunningham, Robert L.; Rhodes, Charles R.; Angotti, Carl; and Warner, Paul H., 4,686,439, Cl. 318-335.000.
Rhodes, Stephen M.: *See*—
Haefner, LeRoy H.; and Rhodes, Stephen M., 4,685,219, Cl. 33-379.000.
Rhone-Poulenc Sante: *See*—
Barriere, Jean-Claude; Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,686,309, Cl. 564-355.000.
Rich, Colin W. Refinishing unit. 4,685,385, Cl. 98-115.200.
Rich, Donald S. Wire terminal. 4,686,326, Cl. 174-87.000.
Richter, Donald L., to Temcor. Shelter roof structure. 4,685,257, Cl. 52-73.000.
Rickborn, Steven F.; and Rogers, Donald Z., to Northrop Corporation. Process for coating small refractory particles. 4,686,116, Cl. 427-215.000.
Rickert Precision Industries, Inc.: *See*—
Claycomb, Jack R., 4,685,518, Cl. 166-243.000.
Ricoh Company, Ltd.: *See*—
Yoshimura, Tsuyoshi, 4,685,795, Cl. 355-8.000.
Riddling, Charles C. Fire hose back pack. 4,685,601, Cl. 224-261.000.
Ridler, Keith D.; Taylor, Peter J.; Poley, John; Norvall, Christopher W.; and Upton, John, to British-American Tobacco Company Limited. Monitoring rod. 4,685,475, Cl. 131-84.100.
Riege, Guenter: *See*—
Huebner, Horst; Tauber, Guenter; Hofbauer, Peter; Glatzer, Roland; Beintze, Guenther; Wagner, Dieter; and Riege, Guenter, 4,685,328, Cl. 73-55.000.
Riemenschneider, Bert R.: *See*—
Tigelaar, Howard L.; and Riemenschneider, Bert R., 4,685,197, Cl. 437-195.000.
Riester, Karlheinz, to Rudolf Riester GmbH & Co. KG Fabrik. Otoscope, with pivotally mounted loupe. 4,685,452, Cl. 128-9.000.
Rietberg, Johan: *See*—
Van der Linde, Robert; and Rietberg, Johan, 4,686,270, Cl. 527-601.000.
Rieter Machine Works, Ltd.: *See*—
Slavik, Walter; Engeli, Ernst; and Lattion, Andre , 4,685,283, Cl. 57-263.000.
Riffle, Judy S.: *See*—
Ward, Robert S., Jr.; and Riffle, Judy S., 4,686,137, Cl. 428-290.000.
Riley, Kim K.: *See*—
Tompkins, E. Neal; Riley, Kim K.; Bartholmae, Jack N.; and Barry, Michael W., 4,686,698, Cl. 379-53.000.
Ringer, Donald A.; and Greco, Michael R., to Drug Package, Inc. Medication packaging and dispensing system. 4,685,271, Cl. 53-246.000.

Risdon Corporation: *See*—
Mattheis, Harley H., 4,685,596, Cl. 222-389.000.

Ritchey, Mary B.; Cano, Francis R.; O'Hara, Gerald J.; English, James D.; and Lin, Wenlii, to American Cyanamid Company. Multivalent pneumococcal vaccine and preparation thereof. 4,686,102, Cl. 424-92.000.

Ritchie, Steven S.: *See*—
Demar, Lawrence E.; and Ritchie, Steven S., 4,685,677, Cl. 273-121.00A.

Ritter, David W., to Sound Mist, Inc. Remotely controlled sound mask. 4,686,693, Cl. 381-73.100.

Rizzardo, Dennis P., to McKesson Corporation. Portable bed assembly. 4,685,160, Cl. 5-68.000.

Robbins, Howard J. Double wall tank manway system. 4,685,585, Cl. 220-256.000.

Robert Bosch GmbH: *See*—
Denz, Helmut; and Stumm, Hans-Peter, 4,685,435, Cl. 123-478.000.
Djordjevic, Ilija, 4,685,433, Cl. 123-373.000.
Weitzel, Otto, 4,686,568, Cl. 358-150.000.

Robert Mathys Co.: *See*—
Mathys, Robert, 4,685,923, Cl. 623-22.000.

Roberts, Auston K.; Trainer, William E.; Nakamura, Steve; Duffin, Leon C.; and Biederman, David L., to Stauffer Chemical Company. Treatment of pyrophoric elemental phosphorus-containing material. 4,686,094, Cl. 423-322.000.

Robertshaw Controls Company: *See*—
Shopsky, Harvey J., 4,685,652, Cl. 251-11.000.

Roblin, William J., III: *See*—
Scheflow, Oliver W.; Roblin, William J., III; Kirsch, Richard C.; and Wunder, William G., 4,685,364, Cl. 83-68.000.

Rockwell International Corporation: *See*—
Johnson, Charles A.; and Young, Jerald A., 4,686,639, Cl. 364-559.000.
Spence, John R., 4,686,652, Cl. 365-230.000.

Rockwell-Rimoldi S.p.A.: *See*—
Marchesi, Franco, 4,685,406, Cl. 112-199.000.

Rodman, Clarke A.: *See*—
Homonoff, Edward C.; Rodman, Clarke A.; and Rutledge, Broaddus L., II, 4,686,136, Cl. 428-286.000.

Rodomista, Guy: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Roebuck, Richard K.: *See*—
DeLapp, Dennis W.; and Roebuck, Richard K., 4,686,467, Cl. 324-158.00F.

Roehrig, Phillip J.; and Gray, Neal R., to Amerock Corporation. Indexable star wheel. 4,685,347, Cl. 74-436.000.

Rogalla, Lyle H., to Environmental Air Contractors, Inc. Treating apparatus and method. 4,686,121, Cl. 427-378.000.

Rogers, Donald Z.: *See*—
Rickborn, Steven F.; and Rogers, Donald Z., 4,686,116, Cl. 427-215.000.

Rogers, Richard B.; and Goring, Cleve A. I., to Dow Chemical Company, The. Pyridyloxyphenoxyalkanoates, alkenoates and derivatives thereof, useful as herbicidal agents. 4,685,959, Cl. 71-94.000.

Rohan, Kieran P. Means for simulating a topographical area. 4,685,884, Cl. 434-152.000.

Roinestad, Gerald C., to Ashworth Bros., Inc. Conveyor belt drive sprocket system. 4,685,557, Cl. 198-834.000.

Roland, Leonard A.: *See*—
Grellmann, H. Erwin; and Roland, Leonard A., 4,686,492, Cl. 333-33.000.

Rolls-Royce plc: *See*—
Angus, James P.; and Perry, Derick A., 4,685,864, Cl. 416-229.00R.

Rorden, William L., to Graham-Patten Systems, Inc. Phase-locked loop circuit. 4,686,689, Cl. 375-81.000.

Rosenquist, Niles R.: *See*—
Howery, Richard W.; Rosenquist, Niles R.; Pyles, Robert A.; and Mulvey, Patrick J., 4,686,277, Cl. 528-493.000.

Rosentreter, Ulrich; Perzborn, Elisabeth; and Seuter, Friedel, to Bayer Aktiengesellschaft. 1,4-dihydropyridines. 4,686,229, Cl. 514-332.000.

Rosenzweig, Nachum; and Skanderup, Ken W., to Raychem Corporation. Temperature indication assembly for use with heat-recoverable articles. 4,686,071, Cl. 264-27.000.

Roshala, John L., to Trio-Tech. Device for loading components into a centrifuge to be tested. 4,685,853, Cl. 414-404.000.

Rosier, Jean-Claude, to Societe Europeenne de Propulsion. High resolution image restitution apparatus for a plane film supplied from a coil and cut into film-portions. 4,686,541, Cl. 346-108.000.

Rosner, Peter: *See*—
Heidelberg, Gotz; Grundl, Andreas; and Rosner, Peter, 4,686,435, Cl. 318-135.000.

Ross, Cyrus A.; and Thurow, Eberhard, to Les Explosifs Nordex Ltee/Nordex Explosives Ltd. Mix-delivery system for explosives. 4,685,375, Cl. 86-20.150.

Ross, Ludwig: *See*—
Gliemeroth, Georg; Ross, Ludwig; Eichhorn, Uwe; Hoelzel, Eva G.; and Speit, Burkhard, 4,686,196, Cl. 501-13.000.

Rowe, Fred, to Phillips Petroleum Company. Process system including fluid flow control apparatus. 4,686,086, Cl. 422-111.000.

Roy, Roger E. Method and apparatus for reinforcing building brick veneer footings. 4,685,268, Cl. 52-742.000.

Royalite Plastics Limited: *See*—
Worns, John R.; Farber, Milton; and Hughes, David T., 4,686,172, Cl. 430-286.000.

Rubik, Erno, to 501 Rubik Studio. Foldable composite system. 4,685,680, Cl. 273-155.000.

Rubik, Erno; and Fai, Cheung K., to 501 Rubik Studio. Composite array apparatus and method. 4,685,681, Cl. 273-155.000.

Rubin, Richard H.; Hillman, Gary; Zarr, Lewis E.; and Hayes, William K., to Machine Technology, Inc. Process apparatus and method and elevator mechanism for use in connection therewith. 4,685,852, Cl. 414-404.000.

Ruchser, Erich, to Herion-Werke KG. Seal for rodless cylinder with shuttle piston. 4,685,383, Cl. 92-88.000.

Rudenauer, Friedrich: *See*—
Stangl, Gunther; and Rudenauer, Friedrich, 4,686,162, Cl. 430-5.000.

Rudolf Riester GmbH & Co. KG Fabrik: *See*—
Riester, Karlheinz, 4,685,452, Cl. 128-9.000.

Rudy, William J., Jr.: *See*—
Denlinger, Keith R.; Rudy, William J., Jr.; and Stahl, Daniel E., 4,685,886, Cl. 439-55.000.

Rufray, Jean-Claude: *See*—
Berland, Pierre-Axel; and Rufray, Jean-Claude, 4,686,432, Cl. 315-403.000.

Ruigrok, Jacobus J. M.: *See*—
Van Ooijen, Johannes A. C.; and Ruigrok, Jacobus J. M., 4,686,472, Cl. 324-252.000.

Rumelhard, Christian, to Thomson-CSF. Biasing circuit for a field effect transistor. 4,686,387, Cl. 307-296.00R.

Rumpf, Jurg: *See*—
Hoegerle, Karl; Cellarius, Hans J.; Rathgeb, Paul; and Rumpf, Jurg, 4,686,294, Cl. 548-140.000.

Runnells, Ann: *See*—
LaMonica, Joseph B., 4,685,239, Cl. 43-6.000.

Rupert, Martin R.: *See*—
Hoffer, John C.; Caron, Bernard G.; and Rupert, Martin R., 4,685,764, Cl. 350-96.200.

Rupprecht, Kathleen M.: *See*—
Chang, Michael N.; Jensen, Norman P.; Hammond, Milton L.; Zambias, Robert A.; McDonald, John; and Rupprecht, Kathleen M., 4,686,235, Cl. 514-520.000.

Rush, Elizabeth A.; Howell, Dan M.; and Kolpek, Robert A., to International Business Machines Corporation. Word processor with alternative formatted and unformatted display modes. 4,686,649, Cl. 364-900.000.

Russo, Vincent: *See*—
Heesch, Max O.; and Russo, Vincent, 4,685,729, Cl. 297-193.000.

Rutgers, The State University of New Jersey: *See*—
Shifriss, Oved, 4,686,319, Cl. 800-1.000.

Rutledge, Broaddus L., II: *See*—
Homonoff, Edward C.; Rodman, Clarke A.; and Rutledge, Broaddus L., II, 4,686,136, Cl. 428-286.000.

Ruud, Clayton O. Method for determining internal stresses in polycrystalline solids. 4,686,631, Cl. 364-508.000.

Ryan, Jack L.; Bray, Lane A.; and Boldt, Allyn L., to Exxon Research and Engineering Company. Dissolution of PuO_2 or NpO_2 using electrolytically regenerated reagents. 4,686,019, Cl. 204-1.500.

Ryko Manufacturing Company: *See*—
Nelson, James A., 4,685,169, Cl. 15-302.000.

Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,686,139, Cl. 428-323.000.

S.F.E.N.A., S.A.: *See*—
Bonfils, Georges L. A., 4,685,338, Cl. 73-862.620.

S-P Manufacturing Corporation, The: *See*—
Hall, William E.; Gailey, Edward D.; and Ovanin, George J., 4,685,687, Cl. 279-119.000.

Sabatino, Raymond A., to Westinghouse Electric Corp. Tube support for moisture separator reheater. 4,685,511, Cl. 165-82.000.

Sabatov, Nissim: *See*—
Ben-Gal, Ofer; and Sabatov, Nissim, 4,685,679, Cl. 273-153.00R.

Sabatucci, Joseph P.: *See*—
Ferdinandi, Eckhardt S.; Mobilio, Dominick; Sabatucci, Joseph P.; and Humber, Leslie G., 4,686,213, Cl. 514-161.000.

Sadow, Brian D. Auxiliary carrying case for luggage. 4,685,546, Cl. 190-102.000.

Safety Solutions Co. Inc.: *See*—
Eydt, Christopher A., 4,686,423, Cl. 315-82.000.

Saggy, Shlomo: *See*—
Soffer, Abraham; Koresh, Jacob E.; and Saggy, Shlomo, 4,685,940, Cl. 55-158.000.

Saida, Toyoyasu; Sunagawa, Takahisa; Yamakawa, Tsuneo; Ohta, Norima; and Obara, Keishi, to Toyo Engineering Corporation. Method of batchwise treating radioactive organic wastes. 4,686,068, Cl. 252-632.000.

Saiga, Yoshiko: *See*—
Katsuragi, Yasuhiro; Matsuda, Naoki; Saiga, Yoshiko; Kobayashi, Yasunobu; Nakamura, Masakazu; and Satoh, Toshio, 4,686,206, Cl. 514-27.000.

Sailer, Hubert: *See*—
Ehrlinger, Friedrich J.; Muller, Franz; Simon, Herbert; and Sailer, Hubert, 4,685,343, Cl. 74-331.000.

Saito, Akinori; Yamada, Masatoshi; Imai, Kenji; Kawamura, Kiyomi; and Kimura, Masanobu, to Kabushiki Kaisha Toyota Chuo Kenkyu-

sho. Method and device for forming mixture gas in direct injection type internal combustion engine. 4,685,432, Cl. 123-276.000.
Saito, Naoki: *See*—
Aoki, Kozo; Ono, Michio; Saito, Naoki; and Umemoto, Makoto, 4,686,177, Cl. 430-553.000.
Saito, Shigeaki: *See*—
Koseki, Toshikazu; and Saito, Shigeaki, 4,686,668, Cl. 370-15.000.
Saito, Susumu; Suzuki, Michio; Suda, Kyo; Yatsugake, Yasuo; and Tsukada, Kazuya, to Hitachi, Ltd.; and Hitachi Electronics Engineering Co. Ltd. Small particle detection system. 4,685,802, Cl. 356-339.000.
Saito, Takayuki: *See*—
Kumagai, Yuugo; Moribe, Isamu; Saito, Takayuki; Fujita, Toshiyuki; and Kobayashi, Akihiro, 4,686,166, Cl. 430-109.000.
Saito, Toshiyuki: *See*—
Kaneko, Yoshiaki; Saito, Toshiyuki; and Okubo, Naofumi, 4,686,494, Cl. 333-137.000.
Saitoh, Kuniyuki: *See*—
Fukuda, Hiroyuki; Shigeta, Masatomo; Kaji, Hisatsugu; and Saitoh, Kuniyuki, 4,686,072, Cl. 264-29.500.
Sajima, Yasuo: *See*—
Oda, Yoshio; Asawa, Tatsuro; Sato, Kimihiko; and Sajima, Yasuo, 4,686,026, Cl. 204-252.000.
Sakaguchi, Mitsuhito: *See*—
Ohta, Yoshinori; Sakuma, Isamu; Hibiya, Taketoshi; and Sakaguchi, Mitsuhito, 4,686,678, Cl. 372-33.000.
Sakai, Masayuki: *See*—
Kuribayashi, Kiyoshi; Sakai, Masayuki; Monji, Hideto; Aoki, Masaki; Okinaka, Hideyuki; and Torii, Hideo, 4,685,948, Cl. 65-26.000.
Sakai, Mutsuo, to Sanyo Electric Co., Ltd. Digital signal receiver. 4,686,706, Cl. 455-186.000.
Sakai, Tadashi: *See*—
Oki, Ryuji; and Sakai, Tadashi, 4,686,708, Cl. 455-280.000.
Sakai, Takuo; and Katsuragi, Tohoru. Process for preparing pectin from plant tissues. 4,686,187, Cl. 435-275.000.
Sakaki, Hirokazu: *See*—
Nakanishi, Haruo; Ohba, Hisao; and Sakaki, Hirokazu, 4,686,021, Cl. 204-129.750.
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.
Sakaki, Mamoru: *See*—
Arai, Ryuichi; and Sakaki, Mamoru, 4,686,118, Cl. 427-261.000.
Sakakibara, Jinsaku: *See*—
Migita, Yoshihiro; Eguchi, Tadashi; Kumazawa, Yukinari; Nakagami, Jozi; Amano, Takehiro; Sota, Kaoru; and Sakakibara, Jinsaku, 4,686,292, Cl. 544-343.000.
Sakakibara, Yasuyuki: *See*—
Kamiya, Sigeru; Kojima, Akikazu; and Sakakibara, Yasuyuki, 4,685,290, Cl. 60-274.000.
Sakamaki, Hisashi: *See*—
Shimizu, Katsuichi; Sakamaki, Hisashi; Furuichi, Katsushi; and Honma, Toshio, 4,685,796, Cl. 355-14.00R.
Sakamoto, Masahiro, to Canon Kabushiki Kaisha. Image processing apparatus. 4,686,579, Cl. 358-282.000.
Sakuichi, Sakakibara; Yoshiaki, Tokuda; Tamio, Nagai; Yorinobu, Takino; and Tomiro, Arai, to Matsui Manufacturing Co., Ltd.; and House Food Industrial Company Limited. Mixing apparatus for powdered or granular materials. 4,685,810, Cl. 366-150.000.
Sakuma, Isamu: *See*—
Ohta, Yoshinori; Sakuma, Isamu; Hibiya, Taketoshi; and Sakaguchi, Mitsuhito, 4,686,678, Cl. 372-33.000.
Sakuma, Masato: *See*—
Tachikawa, Mamoru; Sakuma, Masato; Ueki, Satoshi; Imai, Chihiro; and Makishima, Tokuo, 4,686,199, Cl. 502-104.000.
Sakurai, Hitoshi. Wheel anti-skid attachment. 4,685,743, Cl. 301-44.00T.
Sakurai, Mikio: *See*—
Ishikawa, Toshimitsu; Ozawa, Mishihiro; Sakurai, Mikio; Konno, Mutsuo; Aizawa, Yasuhiro; Igarashi, Takao; and Hirakawa, Hiromasa, 4,686,079, Cl. 376-444.000.
Sakurai, Yojiro: *See*—
Huff, Joel R.; Baldwin, John J.; Sakurai, Yojiro; Vacca, Joseph P.; and Guare, James P., Jr., 4,686,226, Cl. 514-285.000.
Salle de Chou, Jacques: *See*—
Burger, Jacques; Gadelle, Claude; and Salle de Chou, Jacques, 4,685,836, Cl. 405-264.000.
Salmon, Guy: *See*—
Chevroulet, Leon; and Salmon, Guy, 4,685,875, Cl. 425-136.000.
Saltzman, Jeremy: *See*—
Hipp, Betsy; Saltzman, Jeremy; and Dwyer, John J., 4,686,587, Cl. 360-74.200.
Samsonite Corporation: *See*—
King, William L., 4,685,560, Cl. 206-287.100.
Samsung Electronics Co., Ltd.: *See*—
Park, Beom C., 4,686,444, Cl. 320-31.000.
Samuels, George J.; and Garman, Joseph M., to Allied Corporation. Nickel/indium alloy and method of using same in the manufacture of printed circuit boards. 4,686,015, Cl. 204-15.000.
Sanden Corporation: *See*—
Negishi, Hideo; and Wakabayashi, Mikiya, 4,685,590, Cl. 221-241.000.
Sandoz Ltd.: *See*—
Benguerel, Francois; and Mislin, Roland, 4,685,934, Cl. 8-684.000.
Nickell, Louis G.; Stach, Leonard J.; and Hokama, Takeo, 4,685,960, Cl. 71-94.000.
Pedrazzi, Reinhard, 4,686,285, Cl. 534-606.000.
Sandoz Pharmaceuticals Corp.: *See*—
Anderson, Paul L., 4,686,237, Cl. 514-532.000.
Sands, Robert W., to General Electric Company. Incandescent lamp having an improved axial mounting structure for a filament. 4,686,411, Cl. 313-271.000.
Sanechika, Kenichi: *See*—
Yoshino, Akira; and Sanechika, Kenichi, 4,686,160, Cl. 429-50.000.
Sanford, George G.: *See*—
Donovan, William J.; and Sanford, George G., 4,686,627, Cl. 364-481.000.
Sangamo Weston, Inc.: *See*—
Stevens, Ray; and Perry, Duane, 4,686,460, Cl. 324-142.000.
Sanko Kogyo Kabushiki Kaisha: *See*—
Miyashita, Naoya, 4,685,707, Cl. 285-328.000.
Santel, Hans-Joachim: *See*—
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,956, Cl. 71-92.000.
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,957, Cl. 71-92.000.
Sanyo Electric Co., Ltd.: *See*—
Fukasawa, Minoru, 4,686,340, Cl. 219-10.770.
Kishi, Yasuo, 4,686,321, Cl. 136-244.000.
Miyake, Yasuo; Tajima, Osamu; Nishioka, Masato; and Itoh, Yasuhiko, 4,686,157, Cl. 429-19.000.
Sakai, Mutsuo, 4,686,706, Cl. 455-186.000.
Sapone, Frank P., to Carlingswitch, Inc. Snap-on actuator for toggle switch. 4,686,339, Cl. 200-339.000.
Sarau, Henry M.: *See*—
Bender, Paul E.; Griswold, Don E.; Hanna, Nabil; and Sarau, Henry M., 4,686,231, Cl. 514-333.000.
Sargeant, Nick B.: *See*—
Beaven, Paul A.; Canton, Dave A.; Sargeant, Nick B.; and Snagge, Tom H., 4,686,521, Cl. 340-703.000.
Sartor, Leo: *See*—
Olivieri, Icaro; and Sartor, Leo, 4,685,226, Cl. 36-120.000.
Sartorius GmbH: *See*—
Knothe, Erich; Melcher, Franz-Josef; and Oldendorf, Christian, 4,685,525, Cl. 177-25.000.
Sasaki, Mitsuru: *See*—
Takahashi, Junya; Sasaki, Mitsuru; Noguchi, Hiroshi; and Kato, Toshiro, 4,686,232, Cl. 514-365.000.
Sasaki, Nobuyoshi, to M.C.L. Co., Ltd. Nozzle assembly for injection molding. 4,685,881, Cl. 425-562.000.
Sasaki, Shoji, to Toyota Jidosha Kabushiki Kaisha. Device for supporting nozzle vanes of a turbocharger. 4,685,869, Cl. 417-407.000.
Sashida, Nobuo: *See*—
Takeda, Masatoshi; and Sashida, Nobuo, 4,686,447, Cl. 323-210.000.
Sassa, Yuusei, to Yoshida Kogyo K. K. Device for pulling up slider of a slide fastener chain. 4,685,207, Cl. 29-708.000.
Satkamp, Gary A., to McGill Manufacturing Company, Inc. Self-lubricated track-roller bearing and method of constructing the same. 4,685,184, Cl. 29-148.40R.
Sato, Atsushi: *See*—
Takahashi, Naoya; Endo, Keiji; Matsuzaka, Eiichi; Narui, Satoshi; and Sato, Atsushi, 4,686,548, Cl. 503-213.000.
Sato, Fumihiko; and Yamada, Kazuyoshi, to NEC Corporation. Current switching type logic circuit. 4,686,395, Cl. 307-455.000.
Sato, Ichitaro, to Sony Corporation. VTR having automatic carrier detection. 4,686,585, Cl. 360-33.100.
Sato, Ichiya: *See*—
Sato, Kazuo; Shiohata, Kouki; Matsushita, Osami; Kikuchi, Katsuaki; Takasumi, Masakazu; Sato, Ichiya; and Kaneko, Ryoichi, 4,685,335, Cl. 73-660.000.
Sato, Kazuo; Shiohata, Kouki; Matsushita, Osami; Kikuchi, Katsuaki; Takasumi, Masakazu; Sato, Ichiya; and Kaneko, Ryoichi, to Hitachi, Ltd. Method and apparatus for monitoring cracks of a rotatable body. 4,685,335, Cl. 73-660.000.
Sato, Kazuo, to Tokico Ltd. Compressed air supplying device. 4,685,941, Cl. 55-163.000.
Sato, Kimihiko: *See*—
Oda, Yoshio; Asawa, Tatsuro; Sato, Kimihiko; and Sajima, Yasuo, 4,686,026, Cl. 204-252.000.
Sato, Nobuyuki: *See*—
Matsubayashi, Hiroshi; Hirota, Kazumi; Iwamoto, Hisao; Fujiwara, Tamio; Sato, Nobuyuki; and Katsura, Tadahiko, 4,686,152, Cl. 428-607.000.
Sato, Osamu, to NEC Corporation. Synchronous data receiver circuit. 4,686,690, Cl. 375-114.000.
Sato, Takashi; and Yamada, Toshio, to Nippon Steel Corporation. Method for improving the magnetic properties of Fe-based amorphous-alloy thin strip. 4,685,980, Cl. 148-304.000.
Sato, Yoshihiko; and Yamamoto, Nobuaki, to New Japan Radio Co., Ltd. Cathode for magnetron. 4,686,413, Cl. 313-346.00R.
Sato, Yukihiko: *See*—
Nomura, Hirokazu; Sato, Yukihiko; Nishi, Yasuhiko; Higurashi, Mizuho; and Mori, Saburo, 4,686,341, Cl. 219-54.000.
Sato, Yukio: *See*—
Haruta, Kenyu; Wakata, Hitoshi; Sato, Yukio; Nagai, Haruhiko; Nakatani, Hajime; and Kita, Hideki, 4,686,682, Cl. 372-87.000.
Satoh, Masaharu: *See*—
Fukuma, Tositaka; and Satoh, Masaharu, 4,685,769, Cl. 350-332.000.

Satoh, Toshio: *See*—
Katsuragi, Yasuhiro; Matsuda, Naoki; Saiga, Yoshiko; Kobayashi, Yasunobu; Nakamura, Masakazu; and Satoh, Toshio, 4,686,206, Cl. 514-27.000.

Satoru, Isoda; and Kenichi, Inatomi, to Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for measuring cell counts of Methanogens or methane producing activity thereof. 4,686,372, Cl. 250-461.200.

Satoyoshi, Yasuhiko; and Wada, Koji, to Fuji Photo Film Co., Ltd. Cassette for accommodating electrically conductive film. 4,685,638, Cl. 242-199.000.

Saueressig & Co.: *See*—
Saueressig, Karl, 4,685,393, Cl. 101-375.000.

Saueressig, Karl, to Saueressig & Co. Rotogravure cylinder comprising a core and a shell detachably joined thereto. 4,685,393, Cl. 101-375.000.

Saville, James, to Texasgulf Minerals and Metals, Inc. Process for the extraction of platinum group metals. 4,685,963, Cl. 75-10.190.

Savit, Carl H., to Western Geophysical Company of America. Method for generating orthogonal sweep signals. 4,686,654, Cl. 367-41.000.

Sawa, Tsutomu: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, 4,686,308, Cl. 564-219.000.

Sawada, Daisaku; Sugaya, Masami; Soga, Yoshinobu; and Imai, Ryuji, to Toyota Jidosha Kabushiki Kaisha. Continuously variable transmission hydraulic control system having two pressure regulating valves. 4,685,357, Cl. 74-867.000.

Sawada, Hisashi: *See*—
Hidaka, Kazutaka; and Sawada, Hisashi, 4,686,537, Cl. 343-786.000.

Sawada, Takamasa; and Ihikawa, Junji, to Canon Kabushiki Kaisha. Image forming apparatus. 4,685,793, Cl. 355-3.0SH.

Sawyer, Albert J.: *See*—
Ahmad, Mahmood; Sawyer, Albert J.; Schreiner, Wayne L.; and Thomas, Gerald H., 4,686,701, Cl. 379-211.000.

Scarlett, John C.: *See*—
Summers, Frank V.; Scarlett, John C.; Meissner, David C.; and Hoffman, Glenn E., 4,685,964, Cl. 75-38.000.

Schachameyer, Steven R.; Benjamin, James A.; Pardee, John B.; and Hoppie, Lyle O., to Eaton Corporation. Multi-layer semiconductor processing with scavenging between layers by excimer laser. 4,685,976, Cl. 437-173.000.

Schade, Gerold; Paulus, Wilfried; and Schmitt, Hans-Georg, to Bayer Aktiengesellschaft. 3-(3-iodopropargyloxy)-propionitrile, a process for its preparation and its use. 4,686,236, Cl. 514-526.000.

Schaefer, Suzanne E.; and Eckstein, John P., to American Can Company. Dispensing tube package. 4,685,591, Cl. 222-107.000.

Schafer, Otmar U. Process for the staged heating of a material in a treatment apparatus and subsequent cooling thereof. 4,685,507, Cl. 165-2.000.

Schallner, Otto: *See*—
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,956, Cl. 71-92.000.
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Lurssen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,957, Cl. 71-92.000.

Schambre, Frank. Reciprocable tool mounting module. 4,685,613, Cl. 234-131.000.

Schaudt Maschinenbau GmbH: *See*—
Beyer, Rudolf; Heerdt, Lutz-Peter; and Schemel, Roland, 4,685,251, Cl. 51-166.00T.

Scheeler, James W.: *See*—
Collier, John D.; and Scheeler, James W., 4,686,342, Cl. 219-58.000.

Scheflow, Oliver W.; Roblin, William J., III; Kirsch, Richard C.; and Wunder, William G., to Bettcher Industries, Inc. Rotary slicer for comestible products. 4,685,364, Cl. 83-68.000.

Schemel, Roland: *See*—
Beyer, Rudolf; Heerdt, Lutz-Peter; and Schemel, Roland, 4,685,251, Cl. 51-166.00T.

Schemmel, Winfried: *See*—
Rath, Heinrich B.; and Schemmel, Winfried, 4,685,540, Cl. 188-1.110.

Scherer, Kirby V., Jr.; Ono, Taizo; Yamanouchi, Kouichi; and Yokoyama, Kazumasa, to Green Cross Corporation, The. Novel perfluoro chemicals and polyfluorinated compounds and process for production of the same. 4,686,024, Cl. 204-157.950.

Scherer, William C.; Tam, Jimmy W.; and Luebeck, Duane A., to Graco, Inc. Accumulation resistant tip guard. 4,685,621, Cl. 239-288.000.

Schettino, Anthony J.: *See*—
Falzone, Timothy F.; and Schettino, Anthony J., 4,685,791, Cl. 354-277.000.

Schieferstein, Ludwig; Hollenberg, Detlef; and Maak, Norbert, to Henkel Kommanditgesellschaft auf Aktien. Acrylate dispersion and its use for thickening hydrogen peroxide preparations. 4,685,931, Cl. 8-406.000.

Schilling, Andres: *See*—
Kurz, Karl H.; and Schilling, Andres, 4,685,474, Cl. 128-778.000.

Schirneker, Hans-Ludwig. Lead-free bullet for hunting. 4,685,397, Cl. 102-510.000.

Schloss, Alden. Rotary kite. 4,685,642, Cl. 244-153.00A.

Schlosser, Charles M.: *See*—
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Burgess, Trevor M., 4,685,329, Cl. 73-151.000.
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Spehrley, Charles W., Jr.; Schneider, Gary W.; Lipkie, Curtis A.; and Cranston, Dean H., 4,686,581, Cl. 358-294.000.

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Topfl, Werner; Meyer, Willy; and Schneider, Hans-Dieter, 4,685,961, Cl. 71-92.000.

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Cohen, Philip S.; and Schnittger, Robert E., Jr., 4,685,563, Cl. 206-328.000.

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Gliemeroth, Georg; Ross, Ludwig; Eichhorn, Uwe; Hoelzel, Eva G.; and Speit, Burkhard, 4,686,196, Cl. 501-13.000.
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Nestor, John J., Jr.; and Schreiber, Alain B., 4,686,283, Cl. 530-327.000.

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Buhren, Heinz; and Schumacher, Winfried, 4,685,630, Cl. 242-35.50A.

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Lochner, Kaspar; Schurmann, Helmut; and Brand, Erich, 4,686,057, Cl. 252-62.000.

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Kowal, Leonard J.; Schwarz, Albert J.; and Wells, Norman B., 4,685,706, Cl. 285-322.000.

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Burge, Theodor A.; and Schweizer, Reinhard, 4,686,252, Cl. 524-3.000.

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Picker, Franck, 4,685,391, Cl. 100-242.000.

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Liska, Timothy J.; and Scott, Paul F., 4,685,947, Cl. 65-29.000.

Scott, William L.: *See*—
Beyerbach, Daniel M.; Scott, William L.; and Goczalk, Robert W., 4,686,458, Cl. 324-83.00D.

Seaquist, Freddie. Storm shutter. 4,685,261, Cl. 52-202.000.

Seb S.A.: *See*—
Sebillotte, Christian, 4,685,587, Cl. 220-316.000.

Sebalos, Adam. Air brake adjustment tool. 4,685,164, Cl. 7-138.000.

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Nouvelle, Robert; and Segura, Jean L., 4,685,651, Cl. 251-11.000.

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Hirano, Shinichi, 4,685,995, Cl. 156-623.00R.

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Malik, Vedpal S.; Semp, Bernard A.; Bravo, Hernan G.; and Teng, Daniel M., 4,685,478, Cl. 131-297.000.

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Farrar, James G.; and Eskandry, Ezra D., 4,686,513, Cl. 340-572.000.
Humphrey, Floyd B., 4,686,516, Cl. 340-572.000.

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Seuter, Friedel: *See*—
Rosentreter, Ulrich; Perzborn, Elisabeth; and Seuter, Friedel, 4,686,229, Cl. 514-332.000.

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Hobson, Willis S., 4,685,576, Cl. 211-189.000.

Shader, John M. Archery. 4,685,217, Cl. 33-267.000.

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Edwards, Floyd V.; and Shah, Hasmukh, 4,685,902, Cl. 604-153.000.

Shambroom, John R.; and Sliski, Alan P., to Control Data Corporation. Capacitance height gage applied in reticle position detection system for electron beam lithography apparatus. 4,686,531, Cl. 340-870.370.

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McKenna, Charles M.; Sharapata, Irwin R.; and Clark, William M., Jr., 4,686,414, Cl. 313-362.100.

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Truckner, William G.; Jordan, Charles L.; and Sharkins, William R., 4,685,505, Cl. 164-415.000.

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Endo, Yoshihiro; Mizukami, Etsuo; Kishishita, Hiroshi; and Uede, Hisashi, 4,686,110, Cl. 427-38.000.
Fujioka, Yoshihide; Harada, Shigeyuki; Ohba, Toshihiro; Kanatani, Yoshiharu; and Uede, Hisashi, 4,686,426, Cl. 315-169.300.
Fukuma, Tositaka; and Satoh, Masaharu, 4,685,769, Cl. 350-332.000.
Kamada, Hiroshi; and Kita, Sumio, 4,686,704, Cl. 382-61.000.
Matsumoto, Kouichi, 4,685,798, Cl. 355-15.000.
Nawaki, Masaru, 4,686,709, Cl. 455-613.000.
Yano, Seiki; Yamamoto, Saburo; Hayashi, Hiroshi; and Morimoto, Taiji, 4,686,679, Cl. 372-48.000.

Sharpe, Robin, to U.S. Philips Corporation. Waveform converter circuit. 4,686,385, Cl. 307-261.000.

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Nelson, Lowell F.; and Laird, Robert A., 4,685,402, Cl. 109-65.000.

Shearon, Charles W.; Berticevich, Edward N.; and Billett, Ronald J., to FMC Corporation. Protective guard unit for metal working tool. 4,685,214, Cl. 30-391.000.

Sheehan, Richard W.; and Wi'liford, Kenneth A., to World Tech Fibres, Inc. Air processing apparatus. 4,685,179, Cl. 28-248.000.

Sheffer, Phil B., to Merchandising Innovations Co., Inc. Coffee Table. 4,685,401, Cl. 108-153.000.

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Bekooij, Jurrianus; Kooijmans, Petrus G.; Raudenbusch, Werner T.; and Stachowiak, Stephen A., 4,686,248, Cl. 523-404.000.
Bode, Dirk; and Sie, Swan T., 4,686,238, Cl. 518-700.000.

Shen, Chi-Cheong: *See*—
Jeffrey, Edward N.; and Shen, Chi-Cheong, 4,686,449, Cl. 323-231.000.

Sheppard, Douglas B.; Solbes, Albert; Stansel, John C.; and Hill, Lance E., to TRW Inc. Slagging combustion system. 4,685,404, Cl. 110-265.000.

Shia, George A.; and Friedland, David J., to Allied Corporation. Method of inhibiting voltage suppression lithium/fluorinated carbon batteries. 4,686,161, Cl. 429-50.000.

Shibano, Yasuji: *See*—
Masuda, Toru; and Shibano, Yasuji, 4,685,212, Cl. 29-876.000.

Shibata, Makoto: *See*—
Ikeda, Masami; Shibata, Makoto; Takahashi, Hiroto; and Matsuda, Hiroto, 4,686,544, Cl. 346-140.00R.

Shibata, Masaru: *See*—
Onohara, Masayuki; Kawai, Kenji; Shibata, Masaru; Igarashi, Akira; and Kawaguchi, Nobuhisa, 4,686,124, Cl. 428-35.000.

Shibata, Yukio: *See*—
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Shimada, Toshio: *See*—
Inagaki, Takashi; Shimada, Toshio; and Yoshimoto, Tokuji, 4,685,428, Cl. 123-52.00A.

Shimirak, Gerald L.: *See*—
Debbaut, Christian A. M.; Shimirak, Gerald L.; and Swinmurn, John C., 4,686,327, Cl. 174-88.00R.

Shimiza, Akihiro: *See*—
Tamura, Kazuhisa; Watanabe, Hideo; and Shimiza, Akihiro, 4,685,529, Cl. 180-89.120.

Shimizu, Hideo: *See*—
Toyama, Koji; and Shimizu, Hideo, 4,686,138, Cl. 428-323.000.

Shimizu, Katsuichi; Sakamaki, Hisashi; Furuichi, Katsushi; and Honma, Toshio, to Canon Kabushiki Kaisha. Apparatus for controlling image formation. 4,685,796, Cl. 355-14.00R.

Shimizu, Yasuo, to Honda Giken Kogyo Kabushiki Kaisha. Motor-driven power booster. 4,686,433, Cl. 318-50.000.

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Shinjo, Masayoshi: *See*—
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Shinonaga, Hideo: *See*—
Mitsuno, Tatsuyuki; Koyama, Teruhisa; Shinonaga, Hideo; and Daimon, Akio, 4,686,257, Cl. 524-449.000.

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Nishimuta, Kouichi; Izumi, Kazuo; and Shinsugi, Kazue, 4,685,951, Cl. 71-78.000.

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Sato, Kazuo; Shiohata, Kouki; Matsushita, Osami; Kikuchi, Katsuaki; Takasumi, Masakazu; Sato, Ichiya; and Kaneko, Ryoichi, 4,685,335, Cl. 73-660.000.

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Ueda, Ikuo; Shiokawa, Youichi; Kato, Masayuki; Konishi, Nobukiyo; and Akahane, Atsushi, 4,686,227, Cl. 514-292.000.

Shionogi & Co., Ltd.: *See*—
Kono, Masao; Komeno, Taichitro; Ishihara, Shoichi; Yamauchi, Akira; and Okabayashi, Tadashi, 4,686,179, Cl. 435-7.000.

Shirai, Akira: *See*—
Kitaya, Katsuhiko; Iida, Naohiro; Miyake, Atsushi; Kobayashi, Mitsuo; and Shirai, Akira, 4,685,180, Cl. 29-33.00R.
Ohashi, Kaoru; Kobayashi, Ikuya; Nogami, Takahiro; Shirai, Akira; Nakamura, Kazumasa; and Nomura, Yoshihisa, 4,685,547, Cl. 192-3.00R.

Shirakawa, Seiichi: *See*—
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Shizukuishi, Makoto: *See*—
Murayama, Jin; Kondo, Ryuji; Tamayama, Hiroshi; Yano, Takashi; and Shizukuishi, Makoto, 4,686,573, Cl. 358-213.220.

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Matsuyama, Haruhiko; Shoji, Fusaji; and Kuwazuka, Shunichiro, 4,686,147, Cl. 428-447.000.

Shono, Kouichi: *See*—
Nojima, Kazuhiro; Shono, Kouichi; and Takahashi, Mikio, 4,686,119, Cl. 427-362.000.

Shopsky, Harvey J., to Robertshaw Controls Company. Valve construction and method of making the same. 4,685,652, Cl. 251-11.000.

Showa Aluminum Corporation: *See*—
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Shuey, Kenneth C., to Westinghouse Electric Corp. Switch bypass circuit for power line communication systems. 4,686,382, Cl. 307-149.000.

Shuren, Thomas E.: *See*—
Linker, Frank V., Jr.; and Shuren, Thomas E., 4,686,637, Cl. 364-550.000.

Shust, Ryan E.; and MacCourt, Fergus J., to Versatile Corporation. Two speed power take-off. 4,685,340, Cl. 74-11.000.

Sibbel, Uwe. Watering system. 4,685,827, Cl. 405-37.000.

Siccardi, Alberto: *See*—
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Sie, Swan T.: *See*—
Bode, Dirk; and Sie, Swan T., 4,686,238, Cl. 518-700.000.

Siegel, Herbert: *See*—
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Kaarmann, Hans; Lubitz, Karl; Mohaupt, Jutta; Vogt, Martina; and Wersing, Wolfram, 4,686,409, Cl. 310-358.000.
Kessler, Heinrich, 4,686,507, Cl. 340-347.0AD.
Koller, Franz, 4,686,073, Cl. 264-102.000.
Lassmann, Reiner; Krupp, Albert; and Fazekas, Peter, 4,686,455, Cl. 324-73.00R.
Mahrla, Peter, 4,686,557, Cl. 357-34.000.

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Dodin, Andre; Siffert, Odile; Le Thuillier, Georgette; and Allard, Patrice, 4,686,281, Cl. 530-327.000.

Sigma Security Inc.: *See*—
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Sihi GmbH & Co. KG: *See*—
Auschrat, Siegfried, 4,685,865, Cl. 417-68.000.

Sika AG, vorm. Kaspar Winkler & Co.: *See*—
Burge, Theodor A.; and Schweizer, Reinhard, 4,686,252, Cl. 524-3.000.

Silvia, Dana. Cleat cover. 4,685,500, Cl. 150-52.00R.

Simison, Paul C., to Honeywell Inc. Programmable digital hysteresis circuit. 4,686,640, Cl. 364-571.000.

Simm, Hans-Peter: *See*—
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Simmons, Ronald G. Golf shoes. 4,685,227, Cl. 36-127.000.

Simon, Herbert: *See*—
Ehrlinger, Friedrich J.; Muller, Franz; Simon, Herbert; and Sailer, Hubert, 4,685,343, Cl. 74-331.000.

Simon, Reinhard: *See*—
Puhler, Alfred; and Simon, Reinhard, 4,686,184, Cl. 435-172.300.

Simro AG: *See*—
Wiedmann, Helmut; and Czech, Gunther, 4,685,781, Cl. 351-110.000.

Sims, Leon. Athletic knee protector. 4,685,153, Cl. 2-24.000.

Singh, Pushpa: *See*—
Liu, Wen-Chih; Parker, William L.; Singh, Pushpa; and Sykes, Richard B., 4,686,299, Cl. 549-271.000.

Sircar, Shivaji: *See*—
Kratz, Wilbur C.; and Sircar, Shivaji, 4,685,939, Cl. 55-25.000.

Sisk, Robert A., to ETA Thermal Systems Corporation. Apparatus for generating heat and electricity. 4,686,378, Cl. 290-2.000.

Skanderup, Ken W.: *See*—
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Skelton, Dennis C. F., to U.S. Philips Corporation. Line output circuit for generating a line frequency sawtooth current. 4,686,431, Cl. 315-399.000.

Skiles, Jerry W.: *See*—
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Gjestrum, Einar; Dragsund, Inge; Skog, Just; and Selvag, Svein, 4,686,660, Cl. 367-153.000.

Skriba, Michael C.: *See*—
Murray, Alexander P.; Becker, Lawrence F., Jr.; Slater, Clifton G.; and Skriba, Michael C., 4,685,971, Cl. 134-2.000.

Skryabin, Georgy K.: *See*—
Redikultsev, Jury V.; Litvinenko, Leonid A.; Golovlev, Evgeny L.; Golovleva, Ljudmila A.; Chermensky, Dmitry N.; and Skryabin, Georgy K., 4,686,189, Cl. 435-289.000.

Skyaluminium Co., Ltd.: *See*—
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.

Slater, Clifton G.: *See*—
Murray, Alexander P.; Becker, Lawrence F., Jr.; Slater, Clifton G.; and Skriba, Michael C., 4,685,971, Cl. 134-2.000.

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Shambroom, John R.; and Sliski, Alan P., 4,686,531, Cl. 340-870.370.

Sloan-Kettering Institute for Cancer Research: *See*—
Bockman, Richard S.; and Warrell, Raymond P., Jr., 4,686,104, Cl. 424-131.000.

Slocum, Alexander H.; and Peris, James P., to United States of America, Commerce. Method and mechanism for fixturing objects. 4,685,661, Cl. 269-20.000.

Smart, Mary. Self-retracting oxygen tubing. 4,685,456, Cl. 128-205.220.

Smith, Darrell F., Jr.: *See*—
Smith, John S.; and Smith, Darrell F., Jr., 4,685,978, Cl. 148-142.000.

Smith, David C.: *See*—
Noto, Richard; and Smith, David C., 4,686,629, Cl. 364-491.000.

Smith, David S.; and Kamins, Harold W., to Chevron Research Company. System for controlling solid transport. 4,685,842, Cl. 406-106.000.

Smith, Gaylord D.: *See*—
Tassen, Curtis S.; and Smith, Gaylord D., 4,685,427, Cl. 122-511.000.

Smith International, Inc.: *See*—
Herd, David P., 4,685,655, Cl. 251-282.000.

Smith, John S.; and Smith, Darrell F., Jr., to Huntington Alloys Inc. Heat treatments of controlled expansion alloy. 4,685,978, Cl. 148-142.000.

Smith, Leward N. Sharpener for industrial knife blades. 4,685,250, Cl. 51-56.00R.

Smith, Lonnie J.; Blount, Curtis G.; and Petermann, Steven G., to Atlantic Richfield Company. Apparatus for operating wireline tools in wellbores. 4,685,516, Cl. 166-65.100.

Smith, Lynn T. Apron and infant towel. 4,685,154, Cl. 2-48.000.

Smith, Robert W., to Badger Northland, Inc. Conveyor hook link with paddle assembly and coupling method. 4,685,555, Cl. 198-731.000.

Smith, Stephen F., to Alpha-Omega Engineering, Inc. Special vestigial sideband signal for use in communication systems. 4,686,705, Cl. 455-109.000.

SmithKline Beckman Corporation: *See*—
Bender, Paul E.; Griswold, Don E.; Hanna, Nabil; and Sarau, Henry M., 4,686,231, Cl. 514-333.000.
DeMarinis, Robert M.; and Straub, Kenneth M., 4,686,218, Cl. 514-213.000.

Snagge, Tom H.: *See*—
Beaven, Paul A.; Canton, Dave A.; Sargeant, Nick B.; and Snagge, Tom H., 4,686,521, Cl. 340-703.000.

Snouse, Thomas W.: *See*—
Faria, Carl R.; and Snouse, Thomas W., 4,685,193, Cl. 29-558.000.

Societa' Cavi Pirelli S.p.A.: *See*—
Olivares, Sergio, 4,685,416, Cl. 118-125.000.

Societe Anonyme: Boxy Industries: *See*—
Ostermann, Michel E.; and Meriaux, Etienne M., 4,686,251, Cl. 523-448.000.

S.A. Compagnie Internationale des Pieux Armes Frankignoul: *See*—
Massarsch, Karl, 4,685,835, Cl. 405-263.000.

Societe Coninentale du Carton Ondule Socar: *See*—
Ferrari, Hubert, 4,685,609, Cl. 229-15.000.

Societe Europeenne de Propulsion: *See*—
Rosier, Jean-Claude, 4,686,541, Cl. 346-108.000.

Societe Nationale des Poudres et Explosifs: *See*—
Chaussard, Jacques, 4,686,018, Cl. 204-59.00R.

Societe Nationale Elf Aquitaine (Production): *See*—
Staron, Philippe; and Gros, Pierre, 4,686,653, Cl. 367-25.000.

Soffer, Abraham; Koresh, Jacob E.; and Saggy, Shlomo. Separation device. 4,685,940, Cl. 55-158.000.

Soffer, Bernard H.; Efron, Uzi; and Marom, Emanuel, to Hughes Aircraft Company. Numerical division of two arrays by optical processing. 4,686,647, Cl. 364-850.000.

Soga, Hirokazu: *See*—
Terano, Minoru; Soga, Hirokazu; Inoue, Masuo; and Miyoshi, Katsuyoshi, 4,686,200, Cl. 502-112.000.

Soga, Yoshinobu: *See*—
Sawada, Daisaku; Sugaya, Masami; Soga, Yoshinobu; and Imai, Ryuji, 4,685,357, Cl. 74-867.000.

Sokawa, Takuji: *See*—
Hyodo, Masakatsu; Kusumoto, Koji; and Sokawa, Takuji, 4,686,126, Cl. 428-36.000.

Solarchem Research, Division of Brolor Investments, Ltd.: *See*—
Stevens, Richard D. S., 4,686,023, Cl. 204-157.670.

Solberg, Arne L.: *See*—
Meguro, Jun-Ichi; Solberg, Arne L.; Stark, William A.; and Hsei, Paul K., 4,685,880, Cl. 425-416.000.

Solbes, Albert: *See*—
Sheppard, Douglas B.; Solbes, Albert; Stansel, John C.; and Hill, Lance E., 4,685,404, Cl. 110-265.000.

Sommargren, Gary E., to Zygo Corporation. Method and apparatus for the measurement of the refractive index of a gas. 4,685,803, Cl. 356-361.000.

Sommer, Harold Z.; and Owens, Omer O., to United States of America, Army. Chemical agents. 4,686,293, Cl. 546-261.000.

Sonobe, Takashi: *See*—
Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, 4,685,911, Cl. 604-897.000.

Sony Corporation: *See*—
Oki, Ryuji; and Sakai, Tadashi, 4,686,708, Cl. 455-280.000.
Sato, Ichitaro, 4,686,585, Cl. 360-33.100.
Shimada, Satoshi; and Watanabe, Yuji, 4,686,575, Cl. 358-240.000.

Sorenson, Richard W., to Carlingswitch, Inc. Appliance switch. 4,686,336, Cl. 200-61.620.

Sota, Kaoru: *See*—
Migita, Yoshihiro; Eguchi, Tadashi; Kumazawa, Yukinari; Nakagami, Jozi; Amano, Takehiro; Sota, Kaoru; and Sakakibara, Jinsaku, 4,686,292, Cl. 544-343.000.

Sotomura, Mikio: *See*—
Uno, Toshio; Taguchi, Masahiro; Okuno, Toshimi; Kondo, Hirosato; Sotomura, Mikio; and Tsukamoto, Goro, 4,686,221, Cl. 514-254.000.

Sound Mist, Inc.: *See*—
Ritter, David W., 4,686,693, Cl. 381-73.100.

South Alabama Medical Science Foundation: *See*—
Coggin, Joseph H., Jr.; and Payne, William J., Jr., 4,686,180, Cl. 435-7.000.

Spahn, James G.: *See*—
Quillen, Jeffrey B.; and Spahn, James G., 4,685,163, Cl. 5-455.000.

Spangenberg, Robbert E., to Hunter Douglas International N.V. Multiple-glazed window assembly. 4,685,502, Cl. 160-107.000.

Sparling, Michael. Interconnectable beverage container system. 4,685,565, Cl. 206-427.000.

Spaziani, Fred: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Specht, Hans; and Kase, Walter, to Continental Gummi-Werke Aktiengesellschaft. Method of operating an appparatus for producing conveyer belts. 4,685,190, Cl. 29-452.000.

Spector, Donald. Aroma-generating automobile cigarette lighter. 4,686,353, Cl. 219-275.000.

Spector, George: *See*—
Wood, George N.; and Spector, George, 4,685,215, Cl. 33-161.000.

Spehrley, Charles W., Jr.; Schneider, Gary W.; Lipkie, Curtis A.; and Cranston, Dean H., to ANA Tech Corporation. Document scanning system. 4,686,581, Cl. 358-294.000.

Speit, Burkhard: *See*—
Gliemeroth, Georg; Ross, Ludwig; Eichhorn, Uwe; Hoelzel, Eva G.; and Speit, Burkhard, 4,686,196, Cl. 501-13.000.

Spence, John R., to Rockwell International Corporation. Non-volatile RAM cell with single high voltage precharge. 4,686,652, Cl. 365-230.000.

Spencer, Kenneth B.: *See*—
Caner, Ali R.; and Spencer, Kenneth B., 4,685,273, Cl. 53-440.000.

Sperling, Winfried: *See*—
Bauer, Wolfgang; Langer, Manfred; and Sperling, Winfried, 4,686,303, Cl. 560-18.000.

Spigarelli, Donald J.; Peck, Douglas J.; and Finney, James L., to HTC Corporation, The. Continuous solder system. 4,685,605, Cl. 228-37.000.

Sport Cord, Inc.: *See*—
Hagerman, Gene R.; Atkins, John W.; and McMurtry, John G., 4,685,671, Cl. 272-139.000.

Sprecher & Schuh AG: *See*—
Hilfiker, Peter, 4,686,599, Cl. 361-32.000.

Srock, Rainer, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Door for a motor vehicle. 4,685,722, Cl. 296-188.000.

Stach, Leonard J.: *See*—
Nickell, Louis G.; Stach, Leonard J.; and Hokama, Takeo, 4,685,960, Cl. 71-94.000.

Stachowiak, Stephen A.: *See*—
Bekooij, Jurrianus; Kooijmans, Petrus G.; Raudenbusch, Werner T.; and Stachowiak, Stephen A., 4,686,248, Cl. 523-404.000.

Stadler, Peter: *See*—
Lockhoff, Oswald; Kruger, Bernd-Wieland; Stadler, Peter; Paessens, Arnold; Streissle, Gert; Taylor, Peter; Zeiler, Hans-Joachim; and Metzger, Karl-Georg, 4,686,208, Cl. 514-42.000.

Stahl, Daniel E.: *See*—
Denlinger, Keith R.; Rudy, William J., Jr.; and Stahl, Daniel E., 4,685,886, Cl. 439-55.000.

Stamicarbon B.V.: *See*—
Nagtzaam, Nicolaas P.; Bronke, Cornelis; and Brasz, Albert J. H., 4,686,279, Cl. 528-501.000.

Standard Electrik Lorenz AG: *See*—
Ohnsorge, Horst, 4,686,667, Cl. 370-4.000.

Standard Elektrik Lorenz AG: *See*—
Burian, Theodor; and Siegel, Herbert, 4,686,671, Cl. 370-88.000.

Standard Manufacturing Co., Inc.: *See*—
Oswald, Norman D.; Mankey, Harry S.; Dean, Robert R.; and Hudler, Dennis W., 4,685,527, Cl. 180-14.300.

Standard Oil Company, The: *See*—
Biter, William J.; and Ceasar, Gerald P., 4,686,323, Cl. 136-249.000.
Desmond, Michael J.; and Pepera, Marc A., 4,686,203, Cl. 502-331.000.

Stangl, Gunther; and Rudenauer, Friedrich, to Osterreichisches Forschungszentrum Seibersdorf GES, mbH. Optically structured filter and process for its production. 4,686,162, Cl. 430-5.000.

Stanish, Ronald J. Device for cutting or chopping large pieces of bait into smaller ones while immersed in water. 4,685,242, Cl. 43-44.990.

Stanley Electric Co., Ltd.: *See*—
Suda, Fumiyuki; Yasui, Masaru; and Miyamoto, Kazuhiro, 4,686,165, Cl. 430-69.000.

Stansel, John C.: *See*—
Sheppard, Douglas B.; Solbes, Albert; Stansel, John C.; and Hill, Lance E., 4,685,404, Cl. 110-265.000.

Stant Inc.: *See*—
Harris, Robert S., 4,685,584, Cl. 220-204.000.

Stapleton, Gerard V. Tamper proof bottle. 4,685,579, Cl. 215-230.000.

Stark, William A.: *See*—
Meguro, Jun-Ichi; Solberg, Arne L.; Stark, William A.; and Hsei, Paul K., 4,685,880, Cl. 425-416.000.

Staron, Philippe; and Gros, Pierre, to Societe Nationale Elf Aquitaine (Production). Method and device for making geophysical measurements within a wellbore. 4,686,653, Cl. 367-25.000.

Stauffer Chemical Company: *See*—
Chavdarian, Charles G., 4,686,210, Cl. 514-125.000.
Roberts, Auston K.; Trainer, William E.; Nakamura, Steve; Duffin, Leon C.; and Biederman, David L., 4,686,094, Cl. 423-322.000.

Stearns, Robert M.: *See*—
Welker, Mark L.; and Stearns, Robert M., 4,685,308, Cl. 62-171.000.

Steblay, Bernard J., to United States of America, Interior. Constant current, fast and float rate, variable hysteresis battery charger. 4,686,443, Cl. 320-23.000.

Steel Castings Research and Trade Association: *See*—
Ashton, Michael C., 4,685,973, Cl. 134-13.000.

Steen, Wayne R.; and Aitken, William J., to Hanna-Beric Systems, Inc. Re-entrainment and air bleed device for pneumatic pipeline conveying systems. 4,685,841, Cl. 406-84.000.

Steenblik, Richard A.; Phillips, Asa R.; Mamay, Daniel P.; Denson, Lawrence K.; Tucker, Richard A.; and Clark, Jimmy M., to Liberty Specialties, Inc. Device for attaching rain shields to motor vehicle windows. 4,685,718, Cl. 296-154.000.

Steer, John E., to Allied Corporation. Seal means for a master cylinder. 4,685,300, Cl. 60-562.000.

Stegmann, Rudolph; and Mandy, Zoltan A., to Frick Company. Multipurpose valve assembly. 4,685,310, Cl. 62-217.000.

Stein, Friedrich, to Webasto-Werk W. Baier & Co. Process and switching means for controlling heat performance in a heating device. 4,685,616, Cl. 237-12.000.

Steinburg Aktiengesellschaft: *See*—
Kolar, Robert, 4,685,704, Cl. 285-109.000.

Steinhardt, Mark J.: *See*—
Hasse, Margaret H.; and Steinhardt, Mark J., 4,685,915, Cl. 604-378.000.

Steridose Systems AB: *See*—
Lofgren, Peter; and Arthun, Nils, 4,685,494, Cl. 141-65.000.

Stetter, Jorg: *See*—
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,956, Cl. 71-92.000.
Gehring, Reinhold; Schallner, Otto; Stetter, Jorg; Lursen, Klaus; Santel, Hans-Joachim; and Schmidt, Robert R., 4,685,957, Cl. 71-92.000.

Stevens, John H.: *See*—
Raffin, Thomas A.; and Stevens, John H., 4,686,100, Cl. 424-85.000.

Stevens, Ray; and Perry, Duane, to Sangamo Weston, Inc. Solid state electricity meter display. 4,686,460, Cl. 324-142.000.

Stevens, Richard D. S., to Solarchem Research, Division of Brolor Investments, Ltd. Sensitized photochemical preparation of vitamin D. 4,686,023, Cl. 204-157.670.

Stevenson, Kenneth: *See*—
Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.

Stewart, Robert L.: *See*—
Berg, Ronald W.; and Stewart, Robert L., 4,685,909, Cl. 604-360.000.

Stitz, Albert, to Barmag AG. Yarn traversing guide. 4,685,637, Cl. 242-157.00R.

Stockert, Rudiger: *See*—
Koch, Rainer; and Stockert, Rudiger, 4,685,459, Cl. 128-303.170.

Stockton, Gerald W.: *See*—
Meek, John T.; and Stockton, Gerald W., 4,686,365, Cl. 250-281.000.

Stodt, John A.: *See*—
Olsen, Steven L.; Petrick, William R.; and Stodt, John A., 4,686,474, Cl. 324-331.000.

Stohr, Roland: *See*—
Elsasser, Michael; and Stohr, Roland, 4,686,464, Cl. 324-158.00P.

Storage Technology Partners II: *See*—
Baer, James W., 4,686,662, Cl. 369-44.000.

Stowe, Lawrence R.; and Strubhar, Malcolm K., to Mobil Oil Corporation. Hydraulic fracturing and gravel packing method employing special sand control technique. 4,685,519, Cl. 166-278.000.

Straub, Herman, to Sulzer Brothers Limited. Nuclear reactor installation. 4,686,077, Cl. 376-230.000.

Straub, Kenneth M.: *See*—
DeMarinis, Robert M.; and Straub, Kenneth M., 4,686,218, Cl. 514-213.000.

Strauss, Paul, to Zenith Electronics Corporation. Tensed mask color cathode ray tube and mask support frame therefor. 4,686,415, Cl. 313-402.000.

Strauss, Paul: *See*—
Dougherty, Lawrence W.; and Strauss, Paul, 4,686,416, Cl. 313-407.000.

Streisale, Gert: *See*—
Lockhoff, Oswald; Kruger, Bernd-Wieland; Stadler, Peter; Paessens, Arnold; Streissle, Gert; Taylor, Peter; Zeiler, Hans-Joachim; and Metzger, Karl-Georg, 4,686,208, Cl. 514-42.000.

Strife, James R.: *See*—
Dalton, Donald A.; Strife, James R.; and Swindal, James L., 4,686,684, Cl. 372-99.000.

Strigl, Reinhard, to Linde Aktiengesellschaft. Procedure for deoxidizing metal melts. 4,685,965, Cl. 75-93.00R.

Strubhar, Malcolm K.: *See*—
Stowe, Lawrence R.; and Strubhar, Malcolm K., 4,685,519, Cl. 166-278.000.

Struss, Arthur W.; Williams, Terrance L.; and Eby, Lawrence T., to United States Gypsum Company. Lightweight joint compound having improved paintability. 4,686,253, Cl. 524-44.000.

Strysik, John: *See*—
Childress, Dudley; and Strysik, John, 4,685,925, Cl. 623-25.000.

Stuart, Glenn A., to Dow Chemical Company, The. Animal litter and related processes. 4,685,420, Cl. 119-1.000.

Stueke, Walter, to Mannesmann AG. Method of enveloping metal hollows with polyethylene. 4,685,985, Cl. 156-185.000.

Stuke, Michael, to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V. Laser mass spectrometer. 4,686,366, Cl. 250-287.000.

Stumm, Hans-Peter: *See*—
Denz, Helmut; and Stumm, Hans-Peter, 4,685,435, Cl. 123-478.000.

Stumpf, Burkhard: *See*—
Abraham, Wolf-Rainer; Stumpf, Burkhard; and Kieslich, Klaus, 4,686,183, Cl. 435-158.000.

Stumpp & Kurz GmbH & Co.: *See*—
Kessler, Jurgen, 4,685,847, Cl. 411-22.000.

Sturm, Michael: *See*—
Kirsch, Jerome; Kopsco, M. Alan; Markow, Edward; and Sturm, Michael, 4,685,641, Cl. 244-105.000.

Suda, Fumiyuki; Yasui, Masaru; and Miyamoto, Kazuhiro, to Stanley Electric Co., Ltd. Substrate for amorphous silicon photoreceptor. 4,686,165, Cl. 430-69.000.

Suda, Kyo: *See*—
Saito, Susumu; Suzuki, Michio; Suda, Kyo; Yatsugake, Yasuo; and Tsukada, Kazuya, 4,685,802, Cl. 356-339.000.

Sugano, Haruo: *See*—
Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, 4,686,191, Cl. 435-320.000.

Sugasawa, Fukashi: *See*—
Kuroki, Junsuke; and Sugasawa, Fukashi, 4,686,626, Cl. 364-426.000.

Sugawara, Tadashi: *See*—
Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, 4,685,689, Cl. 280-707.000.

Sugaya, Masami: *See*—
Sawada, Daisaku; Sugaya, Masami; Soga, Yoshinobu; and Imai, Ryuji, 4,685,357, Cl. 74-867.000.

Sugden, William M., to Wisconsin Alumni Research Foundation. Recombinant vector and eukaryotic host transformed thereby. 4,686,186, Cl. 435-243.000.

Sugimori, Shigeru, to Chisso Corporation. 4'-substituted-phenyl α-methyl-β-(4-substituted-phenyl) propionates. 4,686,305, Cl. 560-75.000.

Sugio, Akitoshi; Okabe, Masao; Mizukami, Masamichi; and Sekine, Yoshihiko, to Mitsubishi Gas Chemical Company, Inc. Silylated polyphenylene ether membrane for gas separation. 4,686,131, Cl. 428-158.000.

Sugioka, Takami, to Teijin Seiki Co., Ltd. Monitor of abnormality in a yarn winding apparatus. 4,685,629, Cl. 242-18.00R.

Sugishima, Eiichi: *See*—
Katto, Masayuki; and Sugishima, Eiichi, 4,686,480, Cl. 328-62.000.

Suh, John T.: *See*—
Youssefyeh, Raymond D.; Skiles, Jerry W.; Suh, John T.; and Jones, Howard, 4,686,295, Cl. 548-226.000.

Sullivan, George D.: *See*—
Meenan, William C.; and Sullivan, George D., 4,685,220, Cl. 34-10.000.

Sullivan, Sheila M.: *See*—
Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E., 4,686,479, Cl. 324-439.000.

Sulzer Brothers Limited: *See*—
Straub, Herman, 4,686,077, Cl. 376-230.000.

Sumii, Yoshiyuki; and Fukaya, Soshichi, to Japan Vilene Co., Ltd. Cleaning web for fixing rolls on copy machines. 4,686,132, Cl. 428-171.000.

Sumitomo Bakelite Company Ltd.: *See*—
Onohara, Masayuki; Kawai, Kenji; Shibata, Masaru; Igarashi, Akira; and Kawaguchi, Nobuhisa, 4,686,124, Cl. 428-35.000.

Sumitomo Bayer Urethane Co., Ltd.: *See*—
Honda, Masaru; Chiba, Takanori; Imokawa, Toshiaki; Harada, Yoshito; and Nagayasu, Katsumi, 4,686,145, Cl. 428-425.900.

Sumitomo Chemical Company, Limited: *See*—
Mitsuno, Tatsuyuki; Koyama, Teruhisa; Shinonaga, Hideo; and Daimon, Akio, 4,686,257, Cl. 524-449.000.
Nishimuta, Kouichi; Izumi, Kazuo; and Shinsugi, Kazue, 4,685,951, Cl. 71-78.000.
Takahashi, Junya; Sasaki, Mitsuru; Noguchi, Hiroshi; and Kato, Toshiro, 4,686,232, Cl. 514-365.000.

Sumitomo Electric Industries, Ltd.: *See*—
Hara, Akira; Miyake, Masaya; and Yazu, Shuji, 4,686,080, Cl. 419-8.000.
Isshiki, Isao; and Takahashi, Shinichiro, 4,686,483, Cl. 328-165.000.
Tada, Kunio; Nishiwaki, Yoshikazu; and Matsuoka, Shunji, 4,685,763, Cl. 350-96.140.

Sumitomo Light Metal Industries, Ltd.: *See*—
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.

Sumizawa, Akio: *See*—
Abo, Toshimi; Ueno, Takashi; and Sumizawa, Akio, 4,685,302, Cl. 60-602.000.

Summers, Frank V.; Scarlett, John C.; Meissner, David C.; and Hoffman, Glenn E., to Midrex International B.V. Rotterdam. Method and apparatus for producing molten iron using coal. 4,685,964, Cl. 75-38.000.

Sun Chemical Corporation: *See*—
Lindemann, Martin K.; and Deacon, Kim, 4,686,260, Cl. 524-458.000.

Sunagawa, Takahisa: *See*—
Saida, Toyoyasu; Sunagawa, Takahisa; Yamakawa, Tsuneo; Ohta, Norimi; and Obara, Keishi, 4,686,068, Cl. 252-632.000.

Sundstrand Corporation: *See*—
Metcalf, Jeffrey D., 4,685,550, Cl. 192-67.00R.

Sundstrand Data Control, Inc.: *See*—
Burdick, William S., 4,686,567, Cl. 358-150.000.

Sunohio Company: *See*—
Jordan, Otis D., 4,685,834, Cl. 405-237.000.

Sunstar Kabushiki Kaisha: *See*—
Katsuragi, Yasuhiro; Matsuda, Naoki; Saiga, Yoshiko; Kobayashi, Yasunobu; Nakamura, Masakazu; and Satoh, Toshio, 4,686,206, Cl. 514-27.000.

Suntec Industries Incorporated: *See*—
Harwath, Frank L., 4,685,871, Cl. 418-206.000.

Surti, Tyrone N. Ribbon cartridge. 4,685,817, Cl. 400-208.000.

Suzansky, Vasily G.: *See*—
Lyakhevich, Genrikh D.; Khimanych, Anatoly P.; Suzansky, Vasily G.; and Kovalerchik, Vulf P., 4,686,007, Cl. 201-3.000.

Suzuki, Akinori: *See*—
Takematsu, Tetsuo; Suzuki, Akinori; Toda, Kazuya; and Goto, Masuo, 4,685,962, Cl. 71-118.000.

Suzuki, Akio: *See*—
Honda, Chiba; Ueda, Koichi; and Suzuki, Akio, 4,686,178, Cl. 430-569.000.

Suzuki, Hideo: *See*—
Nakamura, Makoto; Suzuki, Hideo; and Kuroki, Toshihiko, 4,686,512, Cl. 340-347.0DD.

Suzuki, Hidetoshi: *See*—
Kato, Yuzo; and Suzuki, Hidetoshi, 4,686,580, Cl. 358-287.000.

Suzuki, Isao: *See*—
Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, 4,686,081, Cl. 420-29.000.

Suzuki, Kenji, to Fuji Photo Film Co., Ltd. Picture image information read-out method and apparatus. 4,686,571, Cl. 358-213.000.

Suzuki, Michio: *See*—
Saito, Susumu; Suzuki, Michio; Suda, Kyo; Yatsugake, Yasuo; and Tsukada, Kazuya, 4,685,802, Cl. 356-339.000.

Suzuki, Mikio; Iwashita, Shigeo; and Hayashi, Masaaki, to Toyoda Koki Kabushiki Kaisha. Electric power steering device for a motor vehicle. 4,685,528, Cl. 180-79.100.

Suzuki, Ryoichi: *See*—
Takigawa, Kazunori; and Suzuki, Ryoichi, 4,685,544, Cl. 188-273.000.

Suzuki, Sohbe: *See*—
Yusa, Atsushi; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,686,555, Cl. 357-30.000.

Suzuki, Takahisa: *See*—
Fujita, Haruyasu; Ogawa, Masao; and Suzuki, Takahisa, 4,685,690, Cl. 280-112.00A.

Suzuki, Takao: *See*—
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; Tsuge, Akihiko; and Suzuki, Takao, 4,685,607, Cl. 228-193.000.

Suzuki, Takashi: *See*—
Tanaka, Tomiho; Suzuki, Takashi; and Watashi, Mitsuo, 4,685,341, Cl. 74-15.820.

Svenka, Peter: *See*—
Pav, Josef; Wenzel, Reinhard; Svenka, Peter; and Rauf, Richard, 4,685,390, Cl. 100-168.000.

Svensson, Bolennart A.: *See*—
Palmqvist, Lars I.; and Svensson, Bolennart A., 4,685,189, Cl. 29-450.000.

Swagelok Company: *See*—
Medvick, Richard J.; Weber, Richard C., Jr.; Wagner, Ross L.; and Brand, Edward M., 4,685,490, Cl. 137-614.030.

Swain, Henry L., to Illinois Tool Works Inc. Releasable stop gate device. 4,685,562, Cl. 206-328.000.

Swindal, James L.: *See*—
Dalton, Donald A.; Strife, James R.; and Swindal, James L., 4,686,684, Cl. 372-99.000.

Swinmurn, John C.: *See*—
Debbaut, Christian A. M.; Shimirak, Gerald L.; and Swimmurn, John C., 4,686,327, Cl. 174-88.00R.

Syka, John E. P.: *See*—
Louris, John N.; Syka, John E. P.; and Kelley, Paul E., 4,686,367, Cl. 250-290.000.

Sykes, Richard B.: *See*—
Liu, Wen-Chih; Parker, William L.; Singh, Pushpa; and Sykes, Richard B., 4,686,299, Cl. 549-271.000.

Syntex (U.S.A) Inc.: *See*—
Nelson, Peter H.; Allison, Anthony C.; and Eugui, Elsie M., 4,686,234, Cl. 514-469.000.
Nestor, John J., Jr.; and Schreiber, Alain B., 4,686,283, Cl. 530-327.000.
Tasset, Carl J., 4,686,002, Cl. 156-659.100.

Syrett, Barry A.; and Kennard, Paul A., to Northern Telecom Limited. Microwave bandpass filters including dielectric resonators mounted on a suspended substrate board. 4,686,496, Cl. 333-202.000.

Systemteknik AB: *See*—
Holm, Lauri J., 4,685,526, Cl. 177-211.000.

Szczerba, Robert M.: *See*—
Pulciani, Sam C.; and Szczerba, Robert M., 4,685,582, Cl. 220-66.000.

Szydlo, Nicolas; and Boulitrop, Francois, to Thomson-CSF. Method for the manufacture of at least one thin film field effect transistor. 4,685,195, Cl. 437-41.000.

Tabak, Samuel A.: *See*—
Quann, Richard J.; and Tabak, Samuel A., 4,686,317, Cl. 585-860.000.

Tachikawa, Mamoru; Sakuma, Masato; Ueki, Satoshi; Imai, Chihiro; and Makishima, Tokuo, to Toa Nenryo Kogyo Kabushiki Kaisha. Process for producing a catalyst component for polymerization of olefins. 4,686,199, Cl. 502-104.000.

Tachikawa Spring Co., Ltd.: *See*—
Kon, Shigeki, 4,686,130, Cl. 428-71.000.

Tada, Kunio; Nishiwaki, Yoshikazu; and Matsuoka, Shunji, to Sumitomo Electric Industries, Ltd. Light modulation device. 4,685,763, Cl. 350-96.140.

Tadao, Takahashi, to Oki Electric Industry Co., Ltd. Power-down circuits for dynamic MOS integrated circuits. 4,686,386, Cl. 307-269.000.

Tadokoro, Eiichi: *See*—
Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,686,139, Cl. 428-323.000.

Taguchi, Masahiro: *See*—
Uno, Toshio; Taguchi, Masahiro; Okuno, Toshimi; Kondo, Hirosato; Sotomura, Mikio; and Tsukamoto, Goro, 4,686,221, Cl. 514-254.000.

Taira, Kazuo: *See*—
Matsuno, Kenji; Yasumuro, Hisakazu; Taira, Kazuo; Imatani, Tsuneo; and Toyoshima, Makoto, 4,685,989, Cl. 156-244.130.

Taisho Pharmaceutical Co., Ltd.: *See*—
Migita, Yoshihiro; Eguchi, Tadashi; Kumazawa, Yukinari; Nakagami, Jozi; Amano, Takehiro; Sota, Kaoru; and Sakakibara, Jinsaku, 4,686,292, Cl. 544-343.000.

Tajima, Osamu: *See*—
Miyake, Yasuo; Tajima, Osamu; Nishioka, Masato; and Itoh, Yasuhiko, 4,686,157, Cl. 429-19.000.

Tajiri, Akira: *See*—
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.

Takada, Hiroshi, to Murata Kikai Kabushiki Kaisha. Reading device in dobby machine. 4,685,492, Cl. 139-68.000.

Takada, Mitsuyuki; Morihiro, Yoshiyuki; and Takasago, Hayato, to Mitsubishi Denki Kabushiki Kaisha. Hybrid integrated circuit substrate and method of manufacturing the same. 4,685,203, Cl. 29-620.000.

Takagi, Hiroshi: *See*—
Nishimura, Yukuo; Kawakami, Eigo; Asano, Toshiaki; Haruta, Masahiro; Takagi, Hiroshi; Noma, Takashi; Mizusawa, Nobutoshi; Nakazawa, Mitsunobu; and Ozawa, Kunitaka, 4,685,766, Cl. 350-96.320.

Takagi, Mitsuhiro: *See*—
Kaneda, Hiroshi; Takagi, Mitsuhiro; and Nakamura, Masaaki, 4,685,581, Cl. 220-3.200.

Takahara, Toshiyuki: *See*—
Imori, Hideo; and Takahara, Toshiyuki, 4,686,399, Cl. 310-62.000.

Takahashi, Hiromichi: *See*—
Hara, Kenji; Takahashi, Hiromichi; Kamiya, Tetsuro; and Tsujii, Kaoru, 4,686,211, Cl. 514-148.000.

Takahashi, Hiroshi, to Nihon Jumbo Kabushiki Kaisha. Film picker for film cartridge. 4,685,209, Cl. 29-806.000.

Takahashi, Hiroto: *See*—
Ikeda, Masami; Shibata, Makoto; Takahashi, Hiroto; and Matsuda, Hiroto, 4,686,544, Cl. 346-140.00R.

Takahashi, Junya; Sasaki, Mitsuru; Noguchi, Hiroshi; and Kato, Toshiro, to Sumitomo Chemical Company, Limited. Fungicidal aniline derivatives. 4,686,232, Cl. 514-365.000.

Takahashi, Masatoshi: *See*—
Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,686,139, Cl. 428-323.000.

Takahashi, Mikio: *See*—
Nojima, Kazuhiro; Shono, Kouichi; and Takahashi, Mikio, 4,686,119, Cl. 427-362.000.

Takahashi, Naoya; Endo, Keiji; Matsuzaka, Eiichi; Narui, Satoshi; and Sato, Atsushi, to Nippon Petrochemicals Company, Limited. Pressure-sensitive recording material. 4,686,548, Cl. 503-213.000.

Takahashi, Ricardo M.: *See*—
Renken, Wayne G.; LeMay, Dan B.; and Takahashi, Ricardo M., 4,685,331, Cl. 73-204.000.

Takahashi, Shinichiro: *See*—
Isshiki, Isao; and Takahashi, Shinichiro, 4,686,483, Cl. 328-165.000.

Takami, Akira, to Mitsubishi Denki Kabushiki Kaisha. Gear transmission. 4,685,348, Cl. 74-437.000.

Takasago, Hayato: *See*—
Takada, Mitsuyuki; Morihiro, Yoshiyuki; and Takasago, Hayato, 4,685,203, Cl. 29-620.000.

Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, to Nippon Steel Corporation. Method for addition of low-melting point metal. 4,686,081, Cl. 420-29.000.

Takasumi, Masakazu: *See*—
Sato, Kazuo; Shiohata, Kouki; Matsushita, Osami; Kikuchi, Katsuaki; Takasumi, Masakazu; Sato, Ichiya; and Kaneko, Ryoichi, 4,685,335, Cl. 73-660.000.

Takatsu, Norihiko, to Nippon Kogaku K. K. Driving device for interline-transfer CCD for use in electronic still camera. 4,686,572, Cl. 358-213.130.

Takayama, Teruyuki: *See*—
Tominaga, Haruo; Takayama, Teruyuki; Ogura, Yoshio; and Yamaguchi, Tetsuo, 4,686,153, Cl. 428-610.000.

Takeda Chemical Industries, Ltd.: *See*—
Nakabayashi, Masamitsu; Kawai, Hideo; Tatsukawa, Suminori; and Kaji, Masayuki, 4,686,133, Cl. 428-209.000.
Nara, Kiyoshi; and Honda, Susumu, 4,686,284, Cl. 530-351.000.

Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; Tsuge, Akihiko; and Suzuki, Takao, to Kabushiki Kaisha Toshiba. Nitride ceramic-metal complex material and method of producing the same. 4,685,607, Cl. 228-193.000.

Takeda, Masatoshi; and Sashida, Nobuo, to Mitsubishi Denki Kabushiki Kaisha. Static var compensators. 4,686,447, Cl. 323-210.000.

Takeda, Ryo: *See*—
Yanazawa, Tadaaki; Tanaka, Teruaki; Noda, Akio; Takeda, Ryo; and Inoue, Masataka, 4,685,320, Cl. 72-250.000.

Takematsu, Tetsuo; Suzuki, Akinori; Toda, Kazuya; and Goto, Masuo, to Yashima Chemical Industrial Co., Ltd. Phenylacetanilide derivatives. 4,685,962, Cl. 71-118.000.

Takemoto, Toyoki: *See*—
Kawakita, Kenji; Nomura, Noboru; and Takemoto, Toyoki, 4,685,198, Cl. 437-73.000.

Takenaka, Kenji; Ohta, Masaki; and Kayukawa, Hiroaki, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Variable displacement wobble plate type compressor with wobble angle control unit. 4,685,866, Cl. 417-222.000.

Takeuchi, Tomio: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, 4,686,308, Cl. 564-219.000.

Takeuchi, Yayoi: *See*—
Nakayama, Kenji; and Takeuchi, Yayoi, 4,686,686, Cl. 375-11.000.

Takigawa, Kazunori; and Suzuki, Ryoichi, to Usui Kokusai Sangyo Kabushiki Kaisha. Sliding exhaust gas brake. 4,685,544, Cl. 188-273.000.

Takimoto, Hiroyuki, to Canon Kabushiki Kaisha. Recording and reproducing apparatus having an automatic tracking control system using multiple pilot signals. 4,686,589, Cl. 360-77.000.

Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, to Fuji Photo Film Co., Ltd.; Sumitomo Light Metal Industries, Ltd.; and Skyaluminium Co., Ltd. Aluminum alloy support for a lithographic printing plate. 4,686,083, Cl. 420-548.000.

Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Vehicle suspension responsive to vertical acceleration and change in height. 4,685,689, Cl. 280-707.000.

Takizawa, Takeshi: *See*—
Nakajima, Junichi; Nakayama, Kenji; and Takizawa, Takeshi, 4,685,498, Cl. 144-208.00B.

Takuma, Yoshiyuki, to Mitsubishi Denki Kabushiki Kaisha. Compressor system and start-up method therefor. 4,685,287, Cl. 60-39.070.

Talley, Eric; and Gounder, Raj N., to RCA Corporation. Electromagnetic radiation reflector structure and method for making same. 4,686,150, Cl. 428-593.000.

Tam, Jimmy W.: *See*—
Scherer, William C.; Tam, Jimmy W.; and Luebeck, Duane A., 4,685,621, Cl. 239-288.000.

Tamagawa, Shigehisa: *See*—
Koike, Kazuyuki; Tamagawa, Shigehisa; and Fuchizawa, Tetsuro, 4,686,546, Cl. 503-200.000.

Tamamushi, Takashige: *See*—
Yusa, Atsushi; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, 4,686,555, Cl. 357-30.000.

Tamayama, Hiroshi: *See*—
Murayama, Jin; Kondo, Ryuji; Tamayama, Hiroshi; Yano, Takashi; and Shizukuishi, Makoto, 4,686,573, Cl. 358-213.220.

Tameo, Robert P.: *See*—
Klassen, David D.; Moyer, Roy E.; Lastrina, Frank A.; and Tameo, Robert P., 4,685,942, Cl. 55-306.000.

Tamio, Nagai: *See*—
Sakuichi, Sakakibara; Yoshiaki, Tokuda; Tamio, Nagai; Yorinobu, Takino; and Tomiro, Arai, 4,685,810, Cl. 366-150.000.

Tamura, Kazuhisa; Watanabe, Hideo; and Shimiza, Akihiro, to Iseki & Co. Ltd. Handle post mounting device for tractor. 4,685,529, Cl. 180-89.120.

Tanabe, Susumu: *See*—
Sekii, Shigehazu; and Tanabe, Susumu, 4,685,470, Cl. 128-692.000.

Tanaka, Aki; and Landis, David E., to P. L. Porter Company. Infinitely positionable lock for reclining seat. 4,685,736, Cl. 297-366.000.

Tanaka, Nobuyoshi: *See*—
Ohmi, Tadahiro; and Tanaka, Nobuyoshi, 4,686,554, Cl. 357-30.000.

Tanaka, Ryutatsu: *See*—
Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, 4,686,081, Cl. 420-29.000.

Tanaka, Teruaki: *See*—
Yanazawa, Tadaaki; Tanaka, Teruaki; Noda, Akio; Takeda, Ryo; and Inoue, Masataka, 4,685,320, Cl. 72-250.000.

Tanaka, Tomiho; Suzuki, Takashi; and Watashi, Mitsuo, to Kubota, Ltd. Power transmitting apparatus for tractor. 4,685,341, Cl. 74-15.820.

Tanaka, Tomoo: *See*—
Morita, Masahiko; Hashimoto, Osamu; and Tanaka, Tomoo, 4,686,471, Cl. 324-243.000.

Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, to Toyota Jidosha Kabushiki Kaisha; and Nippondenso Kabushiki Kaisha. Intake air heater for internal combustion engine with perforated plate heater element partially traversing air passage. 4,685,437, Cl. 123-549.000.

Tanaka, Toshiharu: *See*—
Hayashi, Takayuki; Usami, Toshimasa; and Tanaka, Toshiharu, 4,686,547, Cl. 503-207.000.

Tang, Douglas D., to GTE Laboratories Incorporated. Adjustable waveguide short circuit. 4,686,497, Cl. 333-253.000.

Tang, Robert H., to PPG Industries, Inc. Bis(allyl carbonate) monomer and method for polymerizing same. 4,686,266, Cl. 526-193.000.

Tani, Yoshio; Yabe, Masao; and Naruo, Kyoichi, to Fuji Photo Film Co., Ltd. Information recording medium. 4,686,543, Cl. 346-137.000.

Taniguchi, Tadatsugu: *See*—
Itoh, Seiga; Nishi, Tatsunari; Mizukami, Tamio; Matsumoto, Tadashi; Oka, Tetsuo; Taniguchi, Tadatsugu; and Sugano, Haruo, 4,686,191, Cl. 435-320.000.

Taniguchi, Yoshiaki: *See*—
Ohe, Takeshi; Taniguchi, Yoshiaki; and Arai, Minoru, 4,686,438, Cl. 318-280.000.

Tanimoto, Akikazu: *See*—
Kodama, Kenichi; Tanimoto, Akikazu; Izawa, Hisao; Hamashima, Yoichi; and Hazama, Junji, 4,685,805, Cl. 356-373.000.

Tassen, Curtis S.; and Smith, Gaylord D., to Inco Alloys International, Inc. Alloy for composite tubing in fluidized-bed coal combustor. 4,685,427, Cl. 122-511.000.

Tasset, Carl J., to Syntex (U.S.A.) Inc. Stabilized choline base solutions. 4,686,002, Cl. 156-659.100.

Tate, Marilyn: *See*—
Fifield, Charles C.; Mayes, Richard T.; Tate, Marilyn; and Varnell, Daniel F., 4,686,171, Cl. 430-273.000.

Tatemoto, Minoru: *See*—
Takizawa, Shozo; Tatemoto, Minoru; Furumura, Akio; Sugawara, Tadashi; Kariya, Shigeo; and Hiroshima, Kazuo, 4,685,689, Cl. 280-707.000.

Tatsukawa, Suminori: *See*—
Nakabayashi, Masamitsu; Kawai, Hideo; Tatsukawa, Suminori; and Kaji, Masayuki, 4,686,133, Cl. 428-209.000.

Tauber, Guenter: *See*—
Huebner, Horst; Tauber, Guenter; Hofbauer, Peter; Glatzer, Roland; Beintze, Guenther; Wagner, Dieter; and Riege, Guenter, 4,685,328, Cl. 73-55.000.

Taylor, Bruce F.; and Hagen, Kenneth G., to Thermo Electron - Web Systems, Inc. Steam-shower apparatus and method of using same. 4,685,221, Cl. 34-155.000.

Taylor, Henry F.: *See*—
Goldberg, Lew; Taylor, Henry F.; and Weller, Joseph F., 4,686,485, Cl. 330-4.300.

Taylor, Peter: *See*—
Lockhoff, Oswald; Kruger, Bernd-Wieland; Stadler, Peter; Paessens, Arnold; Streissle, Gert; Taylor, Peter; Zeiler, Hans-Joachim; and Metzger, Karl-Georg, 4,686,208, Cl. 514-42.000.

Taylor, Peter J.: *See*—
Ridler, Keith D.; Taylor, Peter J.; Poley, John; Norvall, Christopher W.; and Upton, John, 4,685,475, Cl. 131-84.100.

TBL Development Corporation: *See*—
Towns, Edward J.; and Brown, Edward M., 4,685,580, Cl. 215-260.000.

Teac Corporation: *See*—
Araki, Tetsuro; and Onda, Hiroyuki, 4,686,509, Cl. 340-347.0DA.

Teijin Limited: *See*—
Azuma, Shizuo; Hiramatsu, Toshiyuki; Nakagawa, Koji; and Ichikawa, Yataro, 4,685,952, Cl. 71-86.000.

Teijin Seiki Co., Ltd.: *See*—
Sugioka, Takami, 4,685,629, Cl. 242-18.00R.

Tektronix, Inc.: *See*—
Boso, Brian; Beenen, Gerhard J.; and Murdock, Bruce, 4,685,185, Cl. 29-157.00C.
Bristol, L. Rodney, 4,686,523, Cl. 340-709.000.
Caspell, George J., 4,686,489, Cl. 331-57.000.
Cleary, Edward J., Jr.; and Coleman, Mike R., 4,686,390, Cl. 307-351.000.
Grellmann, H. Erwin; and Roland, Leonard A., 4,686,492, Cl. 333-33.000.

Telecommunications Radioelectriques et Telephoniques TRT: *See*—
Hourton, Jean-Jacques, 4,686,330, Cl. 379-269.000.

Teledyne Industries, Inc.: *See*—
Lang, Kenneth, 4,686,037, Cl. 210-221.200.

Teleflex Incorporated: *See*—
McBeth, James B., 4,685,293, Cl. 60-327.000.

Telefunken Electronic GmbH: *See*—
Kleefeldt, Frank, 4,686,529, Cl. 340-825.690.
Seifert, Hans-Karl, 4,686,389, Cl. 307-351.000.

Temcor: *See*—
Richter, Donald L., 4,685,257, Cl. 52-73.000.

Teng, Daniel M.: *See*—
Malik, Vedpal S.; Semp, Bernard A.; Bravo, Hernan G.; and Teng, Daniel M., 4,685,478, Cl. 131-297.000.

Teng, Ker-Wen; Nguyen, Bich-Yen; and Parrillo, Louis C., to Motorola, Inc. Integrated circuit trench cell. 4,686,552, Cl. 357-23.600.

Teradyne, Inc.: *See*—
Goodman, Frederick A.; and Prentakis, Antonios E., 4,685,775, Cl. 350-486.000.
Johnson, Lennart B., 4,686,607, Cl. 361-413.000.

Terano, Minoru; Soga, Hirokazu; Inoue, Masuo; and Miyoshi, Katsuyoshi, to Toho Titanium Co., Ltd. Catalyst for the polymerization of olefins. 4,686,200, Cl. 502-112.000.

Teraoka Seikosho Co., Ltd.: *See*—
Kazuharu, Teraoka, 4,685,702, Cl. 283-81.000.

Terreri, Claude J. Swimming pool cover support, covered swimming pool and method of covering a swimming pool. 4,685,254, Cl. 52-2.000.

Terrill, Robert E.: *See*—
Kottman, Rickie A.; Terrill, Robert E.; and Wise, Ann E., 4,685,975, Cl. 134-33.000.

Terumo Kabushiki Kaisha: *See*—
Sekii, Shigehazu; and Tanabe, Susumu, 4,685,470, Cl. 128-692.000.

Tew, Claude E.; and Lewis, Adam J., Jr., to Texas Instruments Incorporated. Infrared imager. 4,686,373, Cl. 250-578.000.

Texaco Inc.: *See*—
Huang, Wann-Sheng; and Hight, Margaret A., 4,685,515, Cl. 166-50.000.

Texas Eastern Drilling Systems, Inc.: *See*—
Hatten, James L., 4,685,895, Cl. 464-19.000.

Texas Instruments Incorporated: *See*—
Bucksch, Walter, 4,686,602, Cl. 361-91.000.
Davis, Cecil J.; Carter, Duane E.; and Jucha, Rhett B., 4,685,999, Cl. 156-643.000.
Kottman, Rickie A.; Terrill, Robert E.; and Wise, Ann E., 4,685,975, Cl. 134-33.000.
McAulay, Alastair D., 4,686,532, Cl. 342-195.000.
Renner, Karl H.; and Morton, Alec J., 4,686,644, Cl. 364-724.000.
Tew, Claude E.; and Lewis, Adam J., Jr., 4,686,373, Cl. 250-578.000.
Tigelaar, Howard L.; and Riemenschneider, Bert R., 4,685,197, Cl. 437-195.000.

Texasgulf Minerals and Metals, Inc.: *See*—
Saville, James, 4,685,963, Cl. 75-10.190.

Textron Inc.: *See*—
Phillips, Charles E., 4,686,445, Cl. 320-61.000.

Thayer, Duane M.: *See*—
Hockings, William A.; and Thayer, Duane M., 4,686,003, Cl. 159-47.300.

Thermionics Laboratory, Inc.: *See*—
Faria, Carl R.; and Snouse, Thomas W., 4,685,193, Cl. 29-558.000.

Thermo Electron - Web Systems, Inc.: *See*—
Taylor, Bruce F.; and Hagen, Kenneth G., 4,685,221, Cl. 34-155.000.

Thomas & Betts Corporation: *See*—
Dienes, Zoltan B., 4,685,981, Cl. 156-48.000.

Thomas, Edward L. Fastener positioning device. 4,685,603, Cl. 227-6.000.

Thomas, Gerald H.: *See*—
Ahmad, Mahmood; Sawyer, Albert J.; Schreiner, Wayne L.; and Thomas, Gerald H., 4,686,701, Cl. 379-211.000.

Thomas, Iorwerth: *See*—
McEwan, Peter M.; and Thomas, Iorwerth, 4,686,393, Cl. 307-31.000.

Thomas Jefferson University: *See*—
Osterholm, Jewell L., 4,686,085, Cl. 422-45.000.

Thomaston, C. Kenneth: *See*—
Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.

Thompson, Mark E.: *See*—
Christensen, Joel R.; Liang, Paul H.; and Thompson, Mark E., 4,685,955, Cl. 71-92.000.

Thompson-Russell, Kathryn C.: *See*—
van den Berg, Adrianus H. M.; and Thompson-Russell, Kathryn C., 4,685,321, Cl. 72-347.000.

Thomsen, Svend E.: *See*—
Christiansen, Preben; Eskildsen, Christian; and Thomsen, Svend E., 4,685,295, Cl. 60-459.000.

Thomson-CGR: *See*—
Chesneau, Rene ; and Prevot, Claude, 4,686,473, Cl. 324-320.000.

Thomson Components - Mostek Corp.: *See*—
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.

Thomson-CSF: *See*—
Rumelhard, Christian, 4,686,387, Cl. 307-296.00R.
Szydlo, Nicolas; and Boulitrop, Francois, 4,685,195, Cl. 437-41.000.

Thoratec Laboratories Corp.: *See*—
Ward, Robert S., Jr.; and Riffle, Judy S., 4,686,137, Cl. 428-290.000.

Thorley, Neil R. Retractable ski leash device embodying dual purpose locking means. 4,685,697, Cl. 280-637.000.

Thornton, Curtis W., to Edward Weck & Company, Inc. Skin clip remover. 4,685,460, Cl. 128-321.000.

Those Characters From Cleveland, Inc.: *See*—
Perkitny, Jerzy; and Chanter, Edward G., 4,685,893, Cl. 446-319.000.

Thurow, Eberhard: *See*—
Ross, Cyrus A.; and Thurow, Eberhard, 4,685,375, Cl. 86-20.150.

Tiegel Manufacturing Co.: *See*—
Wegner, Paul C., 4,685,415, Cl. 118-58.000.

Tigelaar, Howard L.; and Riemenschneider, Bert R., to Texas Instruments Incorporated. Fabricating a stacked capacitor. 4,685,197, Cl. 437-195.000.

Tijunelis, Donatas: *See*—
Patun, Ronald J.; and Tijunelis, Donatas, 4,685,867, Cl. 417-367.000.

Tilstone, Arthur D.: *See*—
McCreery, James F.; and Tilstone, Arthur D., 4,685,844, Cl. 407-114.000.

Ting, Raymond M. L. Aluminum plate curtain wall structure. 4,685,263, Cl. 52-235.000.

Tinker, Alan C.: *See*—
Baxter, Andrew J. G.; Dixon, John; Gould, Kenneth J.; and Tinker, Alan C., 4,686,217, Cl. 514-210.000.

Tinus, Edward J. Seat rebuilding. 4,685,738, Cl. 297-452.000.

Tishken Products Co.: *See*—
Lash, Edward G.; Levy, Roger; and Gleason, Everett, 4,685,367, Cl. 83-626.000.

Titus, Hubert W. Diaper and infant accessory caddy. 4,685,559, Cl. 206-38.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Maruyama, Kouji; Nomura, Takeshi; Ueno, Hiroshi; and Inaba, Naomi, 4,686,265, Cl. 526-125.000.
Tachikawa, Mamoru; Sakuma, Masato; Ueki, Satoshi; Imai, Chihiro; and Makishima, Tokuo, 4,686,199, Cl. 502-104.000.

Toda, Kazuya: *See*—
Takematsu, Tetsuo; Suzuki, Akinori; Toda, Kazuya; and Goto, Masuo, 4,685,962, Cl. 71-118.000.

Todokoro, Akio: *See*—
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, 4,686,328, Cl. 174-153.00R.

Tofanelli, Adler: *See*—
Bruno, Carlo M.; Panarotto, Gianfranco; and Tofanelli, Adler, 4,686,703, Cl. 379-410.000.

Toho Titanium Co., Ltd.: *See*—
Terano, Minoru; Soga, Hirokazu; Inoue, Masuo; and Miyoshi, Katsuyoshi, 4,686,200, Cl. 502-112.060.

Tokai Electric Wire Company Limited: *See*—
Isshiki, Isao; and Hayashi, Hitoshi, 4,685,753, Cl. 439-74.000.

Tokay, Joseph: *See*—
Amundson, Anita L.; and Tokay, Joseph, 4,685,701, Cl. 281-42.000.

Tokico Ltd.: *See*—
Sato, Kazuo, 4,685,941, Cl. 55-163.000.

Tokuda, Masahide: *See*—
Yamada, Minoru; Usui, Mitsuru; Masaki, Akira; Nakanishi, Keiichirou; and Tokuda, Masahide, 4,686,606, Cl. 361-385.000.

Tokunaga, Kuniyuki; and Hashimoto, Tsutomu, to Toyo Soda Manufacturing Co., Ltd. Packing material for liquid chromatography and method for the preparation thereof. 4,686,269, Cl. 526-336.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See*—
Minekane, Tomiharu, 4,685,801, Cl. 356-328.000.

Tomcufcik, Andrew S.: *See*—
Medwid, Jeffrey B.; Torley, Lawrence W.; and Tomcufcik, Andrew S., 4,686,220, Cl. 514-252.000.

Tominaga, Haruo; Takayama, Teruyuki; Ogura, Yoshio; and Yamaguchi, Tetsuo, to Fujikura Ltd. Electrode wire for use in electric discharge machining and process for preparing same. 4,686,153, Cl. 428-610.000.

Tomiro, Arai: *See*—
Sakuichi, Sakakibara; Yoshiaki, Tokuda; Tamio, Nagai; Yorinobu, Takino; and Tomiro, Arai, 4,685,810, Cl. 366-150.000.

Tomita, Masao; Hashima, Akio; Ohta, Haruo; and Matsuo, Tadaaki, to Matsushita Electric Industrial Co., Ltd. Dropout compensating apparatus using a digital delay circuit. 4,686,583, Cl. 358-336.000.

Tomiyama, Hiroshi: *See*—
Douno, Shugo; and Tomiyama, Hiroshi, 4,686,357, Cl. 235-379.000.

Tompkins, E. Neal; Riley, Kim K.; Bartholmae, Jack N.; and Barry, Michael W., to Datapoint Corporation. Workstation for interfacing with a video conferencing network. 4,686,698, Cl. 379-53.000.

Tootle, James N.: *See*—
Dirkin, William; Douglass, Duane; Tootle, James N.; and Benton, Terry L., 4,685,384, Cl. 92-166.000.

Topf, Siegfried: *See*—
Purstinger, Franz; and Topf, Siegfried, 4,685,879, Cl. 425-383.000.

Topfl, Werner; Meyer, Willy; and Schneider, Hans-Dieter, to Ciba-Geigy Corporation. Herbicidal sulfonylureas. 4,685,961, Cl. 71-92.000.

Topshore Limited: *See*—
Wick, Cyril, 4,685,411, Cl. 114-202.000.

Toray Industries, Inc.: *See*—
Okamoto, Miyoshi, 4,686,074, Cl. 264-171.000.

Torbusch, Klaus: *See*—
Holtermann, Otto; Torbusch, Klaus; and Bieber, Gerold, 4,685,548, Cl. 192-0.080.

Torgeson, William L.: *See*—
Shames, George H.; and Torgeson, William L., 4,685,448, Cl. 128-1.00R.

Torii, Hideo: *See*—
Kuribayashi, Kiyoshi; Sakai, Masayuki; Monji, Hideto; Aoki, Masaki; Okinaka, Hideyuki; and Torii, Hideo, 4,685,948, Cl. 65-26.000.

Torley, Lawrence W.: *See*—
Medwid, Jeffrey B.; Torley, Lawrence W.; and Tomcufcik, Andrew S., 4,686,220, Cl. 514-252.000.

Toth, Alexander. Air-swing ball game. 4,685,674, Cl. 273-40.000.

Towns, Edward J.; and Brown, Edward M., to TBL Development Corporation. Anti-panelling container closure. 4,685,580, Cl. 215-260.000.

Toyama, Koji; and Shimizu, Hideo, to Mitsubishi Paper Mills, Ltd. Direct image offset printing plates. 4,686,138, Cl. 428-323.000.

Toyo Engineering Corporation: *See*—
Saida, Toyoyasu; Sunagawa, Takahisa; Yamakawa, Tsuneo; Ohta, Norima; and Obara, Keishi, 4,686,068, Cl. 252-632.000.

Toyo Seikan Kaisha, Ltd.: *See*—
Matsubayashi, Hiroshi; Hirota, Kazumi; Iwamoto, Hisao; Fujiwara, Tamio; Sato, Nobuyuki; and Katsura, Tadahiko, 4,686,152, Cl. 428-607.000.
Matsuno, Kenji; Yasumuro, Hisakazu; Taira, Kazuo; Imatani, Tsuneo; and Toyoshima, Makoto, 4,685,989, Cl. 156-244.130.

Toyo Soda Manufacturing Co., Ltd.: *See*—
Tokunaga, Kuniyuki; and Hashimoto, Tsutomu, 4,686,269, Cl. 526-336.000.
Toyoda Gosei Co., Ltd.: *See*—
Iwasa, Tadanobu; and Yokoi, Hiroshi, 4,686,122, Cl. 427-388.300.
Toyoda Koki Kabushiki Kaisha: *See*—
Ohta, Takeshi; Nakamura, Hiroshi; and Murata, Kazushi, 4,685,850, Cl. 414-225.000.
Suzuki, Mikio; Iwashita, Shigeo; and Hayashi, Masaaki, 4,685,528, Cl. 180-79.100.
Toyoshima, Makoto: *See*—
Matsuno, Kenji; Yasumuro, Hisakazu; Taira, Kazuo; Imatani, Tsuneo; and Toyoshima, Makoto, 4,685,989, Cl. 156-244.130.
Toyota Jidosha Kabushiki Kaisha: *See*—
Itoh, Hiroshi, 4,685,358, Cl. 74-868.000.
Iwatsuki, Kunihiro, 4,685,356, Cl. 74-866.000.
Oba, Hidehiro, 4,685,436, Cl. 123-492.000.
Ohashi, Kaoru; Kobayashi, Ikuya; Nogami, Takahiro; Shirai, Akira; Nakamura, Kazumasa; and Nomura, Yoshihisa, 4,685,547, Cl. 192-3.00R.
Sasaki, Shoji, 4,685,869, Cl. 417-407.000.
Sawada, Daisaku; Sugaya, Masami; Soga, Yoshinobu; and Imai, Ryuji, 4,685,357, Cl. 74-867.000.
Tanaka, Toshiaki; Niwa, Hitoshi; Mukai, Hirokatsu; Miwa, Naoto; Nara, Akio; Nomura, Etsuji; Hori, Makoto; Hasegawa, Koichi; and Noguchi, Hiroshi, 4,685,437, Cl. 123-549.000.
Tsuge, Hiroshi; Fujiwara, Akinori; and Yoshitsugu, Noritada, 4,685,741, Cl. 297-467.000.
Trainer, William E.: *See*—
Roberts, Auston K.; Trainer, William E.; Nakamura, Steve; Duffin, Leon C.; and Biederman, David L., 4,686,094, Cl. 423-322.000.
Transpec Inc.: *See*—
Manning, Donald L.; and Hood, Delos W., 4,685,858, Cl. 414-537.000.
Treadwell, Stephen S., III: *See*—
Leslie, Elmer N.; Treadwell, Stephen S., III; DiFloria, Thomas J.; Propst, Larry D.; Kushmaul, Richard T.; Abney, Paul A.; Stevenson, Kenneth; and Thomaston, C. Kenneth, 4,686,540, Cl. 346-33.00R.
Trebitz, Bernd: *See*—
Moravek, Peter; Trebitz, Bernd; Weller, Albrecht; and Amsel, Klaus, 4,685,229, Cl. 38-84.000.
Tremblay, Ronaldo. Trailer for a two-wheeled vehicle. 4,685,691, Cl. 280-204.000.
Tribometrics, Inc.: *See*—
Lewis, Robert T., 4,686,469, Cl. 324-204.000.
Trio-Tech: *See*—
Roshala, John L., 4,685,853, Cl. 414-404.000.
Triquint Semiconductor, Inc.: *See*—
Li, Jim Y.; and Weiss, Frederick G., 4,686,451, Cl. 323-313.000.
Troncoso, Vincent F. Multiple firing gun and trigger extension assembly. 4,685,379, Cl. 89-136.000.
Truckner, William G.; Jordan, Charles L.; and Sharkins, William R., to Aluminum Company of America. Non-contacting side edge dam means for roll casting. 4,685,505, Cl. 164-415.000.
Trundle, Clive: *See*—
Heller, Harold H.; Oliver, Stephen N.; Whittal, John; Johncock, William; Darcy, Paul J.; and Trundle, Clive, 4,685,783, Cl. 351-163.000.
TRW Inc.: *See*—
Sheppard, Douglas B.; Solbes, Albert; Stansel, John C.; and Hill, Lance E., 4,685,404, Cl. 110-265.000.
TRW Repa GmbH: *See*—
Fohl, Artur, 4,685,740, Cl. 297-468.000.
Tsitovsky, Ilya L.: *See*—
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.
Tsuchida, Shin: *See*—
Takizawa, Kazushige; Sakaki, Hirokazu; Abe, Yuji; Matsuo, Mamoru; Tajiri, Akira; and Tsuchida, Shin, 4,686,083, Cl. 420-548.000.
Tsuchiya, Seigo: *See*—
Ueda, Masahiro; Hakamata, Kohei; and Tsuchiya, Seigo, 4,685,318, Cl. 72-185.000.
Tsuge, Akihiko: *See*—
Takeda, Hiromitsu; Nakahashi, Masako; Shirokane, Makoto; Tsuge, Akihiko; and Suzuki, Takao, 4,685,607, Cl. 228-193.000.
Tsuge, Hiroshi; Fujiwara, Akinori; and Yoshitsugu, Noritada, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho; and Toyota Jidosha Kabushiki Kaisha. Child passenger securing apparatus. 4,685,741, Cl. 297-467.000.
Tsuji, Shintaro; and Umeda, Yasukazu, to Mitsubishi Denki Kabushiki Kaisha. Operating system for elevator. 4,685,539, Cl. 187-126.000.
Tsujii, Kaoru: *See*—
Hara, Kenji; Takahashi, Hiromichi; Kamiya, Tetsuro; and Tsujii, Kaoru, 4,686,211, Cl. 514-148.000.
Tsukada, Kazuya: *See*—
Saito, Susumu; Suzuki, Michio; Suda, Kyo; Yatsugake, Yasuo; and Tsukada, Kazuya, 4,685,802, Cl. 356-339.000.
Tsukamoto, Goro: *See*—
Uno, Toshio; Taguchi, Masahiro; Okuno, Toshimi; Kondo, Hirosato; Sotomura, Mikio; and Tsukamoto, Goro, 4,686,221, Cl. 514-254.000.
Tucker, Richard A.: *See*—
Steenblik, Richard A.; Phillips, Asa R.; Mamay, Daniel P.; Denson, Lawrence K.; Tucker, Richard A.; and Clark, Jimmy M., 4,685,718, Cl. 296-154.000.
Tucker, Robert R.: *See*—
Gould, Diane C.; and Tucker, Robert R., 4,685,892, Cl. 446-109.000.
Tuomainen, Tapio, to Oy Lohja AB. Plate-shaped display structure. 4,686,418, Cl. 313-512.000.
Turn-N-Tame Inc.: *See*—
Fronius, Joe E., 4,685,165, Cl. 15-27.000.
Turner, Robert B.; Peffley, Richard D.; Plepys, Raymond A.; Priester, Ralph D.; Gonzales, Manuel, Jr.; and Bushman, Kimbley A., to Dow Chemical Company, The. Polyurea polymers prepared from urea containing prepolymers. 4,686,242, Cl. 521-137.000.
Turner, Wayne O.: *See*—
Foote, Danny R.; and Turner, Wayne O., 4,685,241, Cl. 43-18.500.
Uchida, Takeshi: *See*—
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, 4,686,308, Cl. 564-219.000.
Ueda, Ikuo; Shiokawa, Youichi; Kato, Masayuki; Konishi, Nobukiyo; and Akahane, Atsushi, to Fujisawa Pharmaceutical Co., Ltd. Imidazoisoquinoline compounds useful as anti-ulcerative agents. 4,686,227, Cl. 514-292.000.
Ueda, Kenji: *See*—
Nishi, Toshiro; Murakami, Nobuaki; Ueda, Kenji; Shirakawa, Seiichi; Notomi, Akira; Hisamatsu, Kenichi; and Kaneko, Shozo, 4,686,158, Cl. 429-26.000.
Ueda, Koichi: *See*—
Honda, Chiba; Ueda, Koichi; and Suzuki, Akio, 4,686,178, Cl. 430-569.000.
Ueda, Masahiro; Hakamata, Kohei; and Tsuchiya, Seigo, to Nippondenso Co., Ltd. Rotary cutter for cutting a continuous corrugated strip. 4,685,318, Cl. 72-185.000.
Ueda, Shigeki; Hatagawa, Toyotsugu; and Kasai, Isao, to Matsushita Electric Industrial Co., Ltd. Heating appliance with internal non-volatile memory. 4,686,356, Cl. 219-482.000.
Uede, Hisashi: *See*—
Endo, Yoshihiro; Mizukami, Etsuo; Kishishita, Hiroshi; and Uede, Hisashi, 4,686,110, Cl. 427-38.000.
Fujioka, Yoshihide; Harada, Shigeyuki; Ohba, Toshihiro; Kanatani, Yoshiharu; and Uede, Hisashi, 4,686,426, Cl. 315-169.300.
Uehara, Shouji: *See*—
Masuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, 4,686,564, Cl. 358-86.000.
Ueki, Satoshi: *See*—
Tachikawa, Mamoru; Sakuma, Masato; Ueki, Satoshi; Imai, Chihiro; and Makishima, Tokuo, 4,686,199, Cl. 502-104.000.
Uekusa, Tsutomu: *See*—
Masuko, Akinori; Kuroiwa, Wataru; Uehara, Shouji; Uekusa, Tsutomu; Rast, Robert M.; and Campbell, W. Sherwood, 4,686,564, Cl. 358-86.000.
Uematsu, Kimio, to Nippon Kogaku K. K. Film guide device in a camera. 4,685,790, Cl. 354-203.000.
Ueno, Hiroshi: *See*—
Maruyama, Kouji; Nomura, Takeshi; Ueno, Hiroshi; and Inaba, Naomi, 4,686,265, Cl. 526-125.000.
Ueno, Takashi: *See*—
Abo, Toshimi; Ueno, Takashi; and Sumizawa, Akio, 4,685,302, Cl. 60-602.000.
Ueshiba, Nozomu; Fukada, Tetsuji; and Ise, Yukihiko, to Matsushita Electric Industrial Co., Ltd. Fine adjustment apparatus for optical system lens. 4,685,767, Cl. 350-255.000.
UHR Corporation: *See*—
Jones, Richard D., 4,685,307, Cl. 62-160.000.
Ui, Masahito; Akiyama, Hideo; Todokoro, Akio; Natsui, Yukio; Kogure, Hiroshi; Kato, Yujiro; and Ozaki, Tsuneo, to Doryokuro Kakunenryo Kaihatsu Jigyodan; and Hitachi Cable Ltd. Hermetically sealed connector for glove box and method for exchanging such connectors. 4,686,328, Cl. 174-153.00R.
Ujazdowski, Richard C.: *See*—
Anderson, Philip M.; Ujazdowski, Richard C.; and Urbanski, Jeffrey C., 4,686,515, Cl. 340-572.000.
Umeda, Yasukazu: *See*—
Tsuji, Shintaro; and Umeda, Yasukazu, 4,685,539, Cl. 187-126.000.
Umemoto, Makoto: *See*—
Aoki, Kozo; Ono, Michio; Saito, Naoki; and Umemoto, Makoto, 4,686,177, Cl. 430-553.000.
Umezawa, Hamao; Takeuchi, Tomio; Hamada, Masa; Naganawa, Hiroshi; Sawa, Tsutomu; Imoto, Masaya; Iinuma, Hironobu; Uchida, Takeshi; and Isshiki, Kunio, to Microbial Chemistry Research Foundation. Novel physiologically active substance MH435. 4,686,308, Cl. 564-219.000.
Unander-Scharin, Hans E. Break-down shelving assembly. 4,685,400, Cl. 108-111.000.
Union Carbide Corporation: *See*—
Bailey, Frederick E., Jr.; Jorgenson, Michael W.; and Whitman, Robert D., 4,686,240, Cl. 521-103.000.
Flanigen, Edith M.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., 4,686,093, Cl. 423-306.000.
Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,686,092, Cl. 423-306.000.
Pellet, Regis J.; Gortsema, Frank P.; Long, Gary N.; and Rabo, Jule A., 4,686,029, Cl. 208-111.000.

Pelton, John F., 4,685,822, Cl. 403-343.000.
Rao, Chennupati K.; and D'Silva, Themistocles D., 4,686,233, Cl. 514-469.000.

Union Oil Company of California: *See—*
Jessup, Peter; Holstedt, Richard A.; and Baron, Kenneth, 4,686,056, Cl. 252-49.700.
Mester, Zoltan C.; and Aitken, Edward J., 4,686,204, Cl. 502-406.000.
Ward, John W., 4,686,030, Cl. 208-216.0PP.
Young, Donald C., 4,686,017, Cl. 204-45.100.

Uniroyal Plastics Co., Inc.: *See—*
Worns, John R.; Farber, Milton; and Hughes, David T., 4,686,172, Cl. 430-286.000.

Unisys Corporation: *See—*
Flora, Laurence P., 4,686,677, Cl. 371-61.000.

United States Gypsum Company: *See—*
Struss, Arthur W.; Williams, Terrance L.; and Eby, Lawrence T., 4,686,253, Cl. 524-44.000.

United States of America
Agriculture: *See—*
Carlson, Steven J.; Donald, William W.; and Lepine, James J., 4,685,481, Cl. 134-155.000.
Lorenz, Linda F., 4,686,140, Cl. 428-342.000.
Air Force: *See—*
Becker, Jack W., 4,686,397, Cl. 310-36.000.
Chang, I-Cheng, 4,685,772, Cl. 350-372.000.
Cricchi, James R.; and Blaha, Franklin C., 4,685,194, Cl. 437-41.000.
Eddy, Frederick N., 4,686,534, Cl. 342-165.000.
Jones, Franklin B.; Kerfoot, Charles S.; and Milberger, Walter E., 4,686,448, Cl. 323-212.000.
America: *See—*
Backlund, Stephen J.; and Olsen, Robert E., 4,686,304, Cl. 560-25.000.
Army: *See—*
Sommer, Harold Z.; and Owens, Omer O., 4,686,293, Cl. 546-261.000.
Commerce: *See—*
Slocum, Alexander H.; and Peris, James P., 4,685,661, Cl. 269-20.000.
Energy: *See—*
Anderson, Herbert L.; Kinnison, W. Wayne; and Lillberg, John W., 4,686,368, Cl. 250-374.000.
Gritzo, Russell E., 4,686,526, Cl. 340-825.060.
Interior: *See—*
Steblay, Bernard J., 4,686,443, Cl. 320-23.000.
National Aeronautics and Space Administration: *See—*
Bush, Harold G.; Mikulas, Martin M., Jr.; Wallsom, Richard E.; and Jensen, J. Kermit, 4,685,535, Cl. 182-63.000.
Navy: *See—*
Brininstool, Michael R., 4,685,799, Cl. 356-73.100.
Goldberg, Lew; Taylor, Henry F.; and Weller, Joseph F., 4,686,485, Cl. 330-4.300.
Jeffrey, Edward N.; and Shen, Chi-Cheong, 4,686,449, Cl. 323-231.000.
Olsen, Richard G., 4,685,462, Cl. 128-422.000.

U.S. Philips Corporation: *See—*
Begas, Henk W. A., 4,686,459, Cl. 324-132.000.
Chung, Kah-Seng; and Verstappen, Hendrikus L., 4,686,688, Cl. 375-47.000.
Derks, Pierre L. L. M.; Lersmacher, Bernhard; and Lydtin, Hans-Jurgen, 4,685,946, Cl. 65-17.000.
Jacrot, Michel, 4,686,410, Cl. 313-113.000.
Kessels, Jozef L. W.; and Bruekers, Alphons A. M. L., 4,686,670, Cl. 370-68.000.
McPherson, Andrew D., 4,686,676, Cl. 371-36.000.
Sharpe, Robin, 4,686,385, Cl. 307-261.000.
Skelton, Dennis C. F., 4,686,431, Cl. 315-399.000.
van de Grift, Robert E. J.; and van der Veen, Martien, 4,686,508, Cl. 340-347.0AD.
van den Berg, Adrianus H. M.; and Thompson-Russell, Kathryn C., 4,685,321, Cl. 72-347.000.
van der Heijden, Antonius W. F.; and Fleuren, Petrus A. M., 4,685,891, Cl. 445-36.000.
Van Ooijen, Johannes A. C.; and Ruigrok, Jacobus J. M., 4,686,472, Cl. 324-252.000.
Zoetman, Herman; and Verbeek, Robert J. M., 4,686,482, Cl. 328-164.000.

United States Pipe and Foundry Company: *See—*
Jones, Lawrence S., 4,685,705, Cl. 285-177.000.

U.S. Precision Lens, Incorporated: *See—*
Moskovich, Jacob, 4,685,774, Cl. 350-432.000.

United States Steel Corporation: *See—*
Howell, John L.; McGreal, Joseph E., Jr.; Nemeth, Edward J.; Waslo, Stephen; and Feinman, Jerome, 4,686,090, Cl. 423-244.000.

United Technologies Corporation: *See—*
Dalton, Donald A.; Strife, James R.; and Swindal, James L., 4,686,684, Cl. 372-99.000.
Dillner, James R., 4,685,660, Cl. 269-7.000.
Hetzer, Frederick C.; and Miller, Guy W., 4,685,286, Cl. 60-39.020.
McLean, Howard J., 4,685,863, Cl. 416-95.000.
Wagner, Robert A.; and Cheo, Peter K., 4,685,988, Cl. 156-250.000.

University of Cincinnati: *See—*
Greenwalt, Tibor J.; and Coe, Norman A., 4,685,314, Cl. 70-57.000.

University of Georgia Research Foundation Inc., The: *See—*
Law, S. Edward; and Bowen, Henry D., 4,685,620, Cl. 239-3.000.

University of Pittsburgh: *See—*
Shames, George H.; and Torgeson, William L., 4,685,448, Cl. 128-1.00R.

University of Rochester: *See—*
Yamane, Masayuki, 4,686,195, Cl. 501-12.000.

University of Strathclyde: *See—*
Birch, David J. S.; and Imhof, Robert E., 4,686,371, Cl. 250-461.100.

Uno, Toshio; Taguchi, Masahiro; Okuno, Toshimi; Kondo, Hirosato; Sotomura, Mikio; and Tsukamoto, Goro, to Kanebo, Ltd. Quinoline-carboxylic acid compounds and antimicrobial agent containing the same. 4,686,221, Cl. 514-254.000.

Upadek, Horst: *See—*
Erwied, Werner; Upadek, Horst; and Wegemund, Bernd, 4,686,255, Cl. 524-104.000.

UPCO, Inc.: *See—*
Baggett, Jay W., 4,685,517, Cl. 166-105.000.

Upjohn Company, The: *See—*
Nelson, Stephen J., 4,686,297, Cl. 549-214.000.

Upton, John: *See—*
Ridler, Keith D.; Taylor, Peter J.; Poley, John; Norvall, Christopher W.; and Upton, John, 4,685,475, Cl. 131-84.100.

Urbanski, Jeffrey C.: *See—*
Anderson, Philip M.; Ujazdowski, Richard C.; and Urbanski, Jeffrey C., 4,686,515, Cl. 340-572.000.

Urschel, Adam: *See—*
Horoldt, Ernst; and Urschel, Adam, 4,686,097, Cl. 423-520.000.

Usami, Toshimasa: *See—*
Hayashi, Takayuki; Usami, Toshimasa; and Tanaka, Toshiharu, 4,686,547, Cl. 503-207.000.

USM Corporation: *See—*
Morse, Albert I., 4,685,418, Cl. 118-503.000.

Usui Kokusai Sangyo Kabushiki Kaisha: *See—*
Takigawa, Kazunori; and Suzuki, Ryoichi, 4,685,544, Cl. 188-273.000.

Usui, Mitsuru: *See—*
Yamada, Minoru; Usui, Mitsuru; Masaki, Akira; Nakanishi, Keiichirou; and Tokuda, Masahide, 4,686,606, Cl. 361-385.000.

USV Pharmaceutical Corporation: *See—*
Youssefyeh, Raymond D.; Skiles, Jerry W.; Suh, John T.; and Jones, Howard, 4,686,295, Cl. 548-226.000.

V. Kann Rasmussen Industri A/S: *See—*
Alkjaer, Peter, 4,685,256, Cl. 52-58.000.

Vacca, Joseph P.: *See—*
Huff, Joel R.; Baldwin, John J.; Sakurai, Yojiro; Vacca, Joseph P.; and Guare, James P., Jr., 4,686,226, Cl. 514-285.000.

Vadjunec, Carl F. Upright wheelchair. 4,685,693, Cl. 280-242.0WC.

Vaes, Jos A.: *See—*
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Valdez, Loredana G. Cigar or cigarette holder. 4,685,477, Cl. 131-175.000.

Valenti, Andrew: *See—*
Cramer, Eva B.; Milks, Linda C.; Conyers, Gregory P.; Valenti, Andrew; and Perez, Antonio, 4,686,190, Cl. 435-291.000.

VALEO: *See—*
Ap, Ngy S., 4,685,430, Cl. 123-142.50R.
Carmillet, Roger; Graton, Michel; and Bacher, Michel, 4,685,896, Cl. 464-68.000.

Valvoline Oil & Chemicals Ltd.: *See—*
Bryant, Collin J.; and Mitsopoulos, Tom, 4,686,275, Cl. 528-295.500.

Van Beek, Allen L.: *See—*
Iversen, Alfred A.; Eastman, William J.; and Van Beek, Allen L., 4,685,447, Cl. 128-1.00R.

Van Camp, Raymond E.: *See—*
Nidiffer, Charles A.; and Van Camp, Raymond E., 4,685,624, Cl. 241-36.000.

Vancha, John: *See—*
Nawrot, Thomas L.; Vancha, John; and Mysicka, James C., 4,686,352, Cl. 219-250.000.

Van Conant, Carl F.: *See—*
Pensabene, Saverio F.; West, Jon K.; Leclair, Robert A.; Van Conant, Carl F.; Catotti, Arthur J.; and Fralick, William L., 4,686,013, Cl. 204-2.100.

van de Grift, Robert E. J.; and van der Veen, Martien, to U.S. Philips Corporation. Analog-to-digital converter circuit. 4,686,508, Cl. 340-347.0AD.

Van den Akker, Johannes A.: *See—*
Cheshire, James O.; Marinack, Robert J.; Van den Akker, Johannes A.; and Lindgren, Douglas L., 4,686,006, Cl. 162-336.000.

van den Berg, Adrianus H. M.; and Thompson-Russell, Kathryn C., to U.S. Philips Corporation. Method of drape drawing a shadow mask for a color display tube. 4,685,321, Cl. 72-347.000.

Van den Berg, Teunis T.; and Eastlack, Thomas D. Molecular differentiation filter. 4,686,041, Cl. 210-335.000.

Vanderburg, Curtis E. Emergency lighting system. 4,686,505, Cl. 340-331.000.

van der Heijden, Antonius W. F.; and Fleuren, Petrus A. M., to U.S. Philips Corporation. Method of assembling an integrated electron gun system. 4,685,891, Cl. 445-36.000.

Van der Hulst, Herman L.; and Meerman, Arend H., to Indapp Engineering B.V. Container grab. 4,685,713, Cl. 294-90.000.

Vanderjagt, John A. Pumping system with control valve. 4,685,592, Cl. 222-148.000.

Van der Linde, Robert; and Rietberg, Johan, to DSM Resins B.V. Process for preparing and processing a resin composition. 4,686,270, Cl. 527-601.000.

van der Veen, Martien: *See*—
van de Grift, Robert E. J.; and van der Veen, Martien, 4,686,508, Cl. 340-347.0AD.

Van der Veen, Siebren C.: *See*—
Cadee, Theodorus P. M.; Van der Veen, Siebren C.; and Fluks, Marten, 4,685,353, Cl. 74-689.000.

Van Driesen, Roger P.; and Friday, John R. Upgrading of high boiling hydrocarbons. 4,686,028, Cl. 208-86.000.

Van Ooijen, Johannes A. C.; and Ruigrok, Jacobus J. M., to U.S. Philips Corporation. Magnetic sensor having closely spaced and electrically parallel magnetoresistive layers of different widths. 4,686,472, Cl. 324-252.000.

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Baker, Rodney C.; and Van Rensburg, Phillippus J., 4,685,423, Cl. 119-86.000.

Vansant, Jan: *See*—
Hall, Robert L.; Franckx, Joris R. I.; Overbergh, Noel M. M.; Doucet, Jos; and Vansant, Jan, 4,685,683, Cl. 277-1.000.

Van Shoubroueck, Fred B.: *See*—
Noel, Vincent R.; and Van Shoubroueck, Fred B., 4,685,376, Cl. 89-1.140.

Varnell, Daniel F.: *See*—
Fifield, Charles C.; Mayes, Richard T.; Tate, Marilyn; and Varnell, Daniel F., 4,686,171, Cl. 430-273.000.

Vaser, Inc.: *See*—
Leckrone, Michael E., 4,685,458, Cl. 128-303.100.

Vaughn, Millard A. Pipe alignment apparatus. 4,685,662, Cl. 269-43.000.

VDO Adolf Schindling AG: *See*—
Baeger, Holm, 4,685,770, Cl. 350-344.000.

VEB Schwermaschinenbau-Kombinat "Ernst Thalman" Magdeburg: *See*—
Krennbauer, Franz; and Fehringer, Friedrich, 4,685,970, Cl. 106-100.000.

Velo Bind, Inc.: *See*—
Abildgaard, William H., 4,685,700, Cl. 281-21.00R.

Verbatim Corporation: *See*—
Bond, Charles R., 4,686,470, Cl. 324-207.000.

Verbeek, Robert J. M.: *See*—
Zoetman, Herman; and Verbeek, Robert J. M., 4,686,482, Cl. 328-164.000.

Verboom, Gilles M. L.: *See*—
Bliznik, Kenneth E.; and Verboom, Gilles M. L., 4,686,065, Cl. 252-159.000.

Vermeulen, Leon L.; Ghys, Theofiel H.; De Smedt, Willy P.; Vervloet, Ludovicus H.; and Callant, Paul R., to Agfa-Gevaert N.V. Photographic silver complex diffusion transfer reversal process under yellow safelight. 4,686,170, Cl. 430-244.000.

Verrier, Guy F.: *See*—
Greanias, Evon C.; Guarnieri, C. Richard; Seeland, John J., Jr.; Verrier, Guy F.; and Donaldson, Robert L., 4,686,332, Cl. 178-19.000.

Versatile Corporation: *See*—
Shust, Ryan E.; and MacCourt, Fergus J., 4,685,340, Cl. 74-11.000.

Verstappen, Hendrikus L.: *See*—
Chung, Kah-Seng; and Verstappen, Hendrikus L., 4,686,688, Cl. 375-47.000.

Verstraeten, Achiel, to Elektro Automaten Verstraeten PVBA. Device for carrying the grab in slot machine cabinets. 4,685,673, Cl. 273-1.0GC.

Vervloet, Ludovicus H.: *See*—
Vermeulen, Leon L.; Ghys, Theofiel H.; De Smedt, Willy P.; Vervloet, Ludovicus H.; and Callant, Paul R., 4,686,170, Cl. 430-244.000.

Veysset, Jean-Paul; Camp, Jean-Jacques; and Noel, Didier, to Electricite de France Service National. Process for eliminating deposits formed in a steam generator of a pressurized water nuclear reactor. 4,686,067, Cl. 252-626.000.

Villemot, Jean-Pierre: *See*—
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,685,473, Cl. 128-772.000.

Violett, Robert S.; and Anderson, W. Lee. Power plant for model jet aircraft. 4,685,289, Cl. 60-269.000.

Visual Marketing Inc.: *See*—
Young, Raymond R.; Deffner, John F.; and Barnes, Russell M., 4,685,574, Cl. 211-59.200.

Voest-Alpine Aktiengesellschaft: *See*—
Cvitas, Vilim; Faltejsek, Karl; Hanke, Reinhart; Janusch, Alois; and Larch, Gerhard, 4,685,899, Cl. 494-44.000.
Krennbauer, Franz; and Fehringer, Friedrich, 4,685,970, Cl. 106-100.000.

Vogt, Martina: *See*—
Kaarmann, Hans; Lubitz, Karl; Mohaupt, Jutta; Vogt, Martina; and Wersing, Wolfram, 4,686,409, Cl. 310-358.000.

Voko Franz Vogt & Co.: *See*—
Machate, Rainer; Vonhausen, Robert; and Hansen, Eckhard, 4,685,733, Cl. 297-284.000.

Vona, Nick: *See*—
Longhouse, Richard E.; and Vona, Nick, 4,685,513, Cl. 165-121.000.

Vonhausen, Robert: *See*—
Machate, Rainer; Vonhausen, Robert; and Hansen, Eckhard, 4,685,733, Cl. 297-284.000.

Von Kohorn, Henry. Apparatus for illuminating centripetally viewed three-dimensional objects. 4,686,611, Cl. 362-123.000.

Vorwerk & Co. Interholding GmbH: *See*—
Ahlf, Heinz-Jurgen; Guhne, Wieland; Simm, Hans-Peter; and Wulf, Peter, 4,685,170, Cl. 15-367.000.

Voss, Hans W.: *See*—
Cremer, Heinz P.; Wittig, W.; and Voss, Hans W., 4,685,727, Cl. 297-180.000.
Deegener, Elmar; Voss, Hans W.; and Franzmann, Gunter, 4,685,739, Cl. 297-452.000.

Vrilakas, Mark: *See*—
Wilson, Louis D.; Jones, Patrick M.; and Vrilakas, Mark, 4,685,333, Cl. 73-478.000.

Vrouenraets, Cornelius M. F., to Akzo nv. Watervapor-permeable, pressure sensitive, antiseptic wound covering material. 4,685,455, Cl. 128-156.000.

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Najmr, Stanislav; Jerman, Zdenek; and Kralicek, Jaroslav, 4,685,935, Cl. 23-304.000.

W. H. Brady Co.: *See*—
Hupfer, Bruce A.; and Hubert, James F., 4,686,144, Cl. 428-421.000.

W. R. Grace & Co., Cryovac Div.: *See*—
Havens, Marvin R., 4,686,148, Cl. 428-520.000.

W. Schlafhorst & Co.: *See*—
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WABCO Westinghouse Fahrzeugbremsen GmbH: *See*—
Kaltenthaler, Wolfgang; Kramer, Manfred; and Gelse, Heinz-Dieter, 4,685,653, Cl. 251-63.600.
Reinecke, Erich, 4,685,745, Cl. 303-100.000.

Wachowski, Raymond J.; and Mulso, Francis A., to Chrysler Motors Corporation. Spring mounted molding for a vehicle. 4,685,712, Cl. 293-128.000.

Wada, Hifumi: *See*—
Nishimura, Shinji; Wada, Hifumi; and Komurasaki, Keiichi, 4,686,446, Cl. 322-33.000.

Wada, Koji: *See*—
Satoyoshi, Yasuhiko; and Wada, Koji, 4,685,638, Cl. 242-199.000.

Wada, Mitsuo; and Nishihara, Kazue, to Agency of Industrial Science and Technology. Flexibly foldable arm. 4,685,349, Cl. 74-479.000.

Wagner, Dieter: *See*—
Huebner, Horst; Tauber, Guenter; Hofbauer, Peter; Glatzer, Roland; Beintze, Guenther; Wagner, Dieter; and Riege, Guenter, 4,685,328, Cl. 73-55.000.

Wagner, Robert A.; and Cheo, Peter K., to United Technologies Corporation. Buried microstrip network processing. 4,685,988, Cl. 156-250.000.

Wagner, Ross L.: *See*—
Medvick, Richard J.; Weber, Richard C., Jr.; Wagner, Ross L.; and Brand, Edward M., 4,685,490, Cl. 137-614.030.

Wait, Michael R.: *See*—
Willard, G. Fred; Wait, Michael R.; Hutchings, David A.; and Lauderback, Sanford K., 4,685,873, Cl. 264-83.000.

Wakabayashi, Mikiya: *See*—
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Wakata, Hitoshi: *See*—
Haruta, Kenyu; Wakata, Hitoshi; Sato, Yukio; Nagai, Haruhiko; Nakatani, Hajime; and Kita, Hideki, 4,686,682, Cl. 372-87.000.

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Wakunaga, Manji; and Nishimura, Yasufumi, 4,686,185, Cl. 435-206.000.

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Wallace, David R., to International Business Machines Corporation. Parser-based attribute analysis. 4,686,623, Cl. 364-300.000.

Wallace, Richard B., to Oakland Corporation, The. Packaged adhesive. 4,686,272, Cl. 528-87.000.

Walling, James D.: *See*—
Ng, Yee Seung; Contois, Lawrence E.; Mitchell, John D.; and Walling, James D., 4,686,163, Cl. 430-47.000.

Wallsom, Richard E.: *See*—
Bush, Harold G.; Mikulas, Martin M., Jr.; Wallsom, Richard E.; and Jensen, J. Kermit, 4,685,535, Cl. 182-63.000.

Walter, Helen J.: *See*—
King, Michael M.; and Walter, Helen J., 4,685,210, Cl. 29-830.000.

Walther, Gerhard; Schneider, Claus; Weber, Karl-Heinz; and Fugner, Armin, to Boehringer Ingelheim KG. 11-(Piperazin- or homopiperazin-1-yl)-5H-imidazo-(2,1-C)(1,4)benzodiazepines useful as anti-allergics. 4,686,219, Cl. 514-220.000.

Walworth, Van T.: *See*—
Conner, Randall C.; and Walworth, Van T., 4,685,708, Cl. 285-374.000.

Wampfler, David J.: *See*—
Pawloski, Chester E.; Wampfler, David J.; and Fielding, Donna J., 4,686,241, Cl. 521-107.000.

Wang, John H. S.: *See*—
Paranto, Joseph N.; Wang, John H. S.; and Williams, Larry, 4,686,681, Cl. 372-82.000.

Wang, John S.: *See—*
Hernandez, Irene H.; Himelstein, Carol S.; and Wang, John S., 4,686,522, Cl. 340-709.000.

Warchol, Mark F. A., to Aluminum Company of America. Measurement of gas content in molten metal using a constant current source. 4,685,325, Cl. 73-19.000.

Ward, John W., to Union Oil Company of California. Mild hydrocracking with a catalyst having a narrow pore size distribution. 4,686,030, Cl. 208-216.0PP.

Ward, Robert S., Jr.; and Riffle, Judy S., to Thoratec Laboratories Corp. Moisture vapor permeable materials. 4,686,137, Cl. 428-290.000.

Warfield, Debra S. S.: *See—*
Lochhead, Robert Y.; and Warfield, Debra S. S., 4,686,254, Cl. 524-99.000.

Wargo, Robert A.: *See—*
Harwood, Leopold A.; Wargo, Robert A.; and Patel, Chandrakant B., 4,686,561, Cl. 358-31.000.

Warner Lambert Technologies, Inc.: *See—*
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Warner, Paul H.: *See—*
Cunningham, Robert L.; Rhodes, Charles R.; Angotti, Carl; and Warner, Paul H., 4,686,439, Cl. 318-335.000.

Warner & Swasey Company, The: *See—*
Myers, Carl J., 4,685,361, Cl. 82-2.00R.

Warrell, Raymond P., Jr.: *See—*
Bockman, Richard S.; and Warrell, Raymond P., Jr., 4,686,104, Cl. 424-131.000.

Warrington, John E.; and Kramer, Dale C., to Hystar Aerospace Development Corporation. Air vehicle. 4,685,640, Cl. 244-29.000.

Washizuka, Syoichi; Watanabe, Masayuki; Yashiro, Sadao; and Nakanishi, Masae, to Kabushiki Kaisha Toshiba. Apparatus for manufacturing compound semiconductor single crystal. 4,686,091, Cl. 422-249.000.

Waslo, Stephen: *See—*
Howell, John L.; McGreal, Joseph E., Jr.; Nemeth, Edward J.; Waslo, Stephen; and Feinman, Jerome, 4,686,090, Cl. 423-244.000.

Watanabe, Hideo: *See—*
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Watanabe, Hideomi: *See—*
Aonuma, Masashi; Watanabe, Hideomi; Miyoshi, Takahito; and Okita, Tsutomu, 4,686,149, Cl. 428-522.000.

Watanabe, Junji, to Kabushiki Kaisha Toshiba. Image forming apparatus. 4,685,794, Cl. 355-7.000.

Watanabe, Masayuki: *See—*
Washizuka, Syoichi; Watanabe, Masayuki; Yashiro, Sadao; and Nakanishi, Masae, 4,686,091, Cl. 422-249.000.

Watanabe, Nobuhiro: *See—*
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Watanabe, Takemi, to Kabushiki Kaisha Kaneda Kikai Seisakusho. Automatic device for preparing paper rolls for web pasting. 4,685,392, Cl. 101-226.000.

Watanabe, Yoshio: *See—*
Ono, Yoshinobu; and Watanabe, Yoshio, 4,685,551, Cl. 198-346.200.

Watanabe, Yoshiyuki; and Shibata, Yukio, to Fuji Photo Film Co., Ltd. Overriding loading door for a magnetic recording/reproducing apparatus. 4,686,593, Cl. 360-97.000.

Watanabe, Yuji: *See—*
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Watashi, Mitsuo: *See—*
Tanaka, Tomiho; Suzuki, Takashi; and Watashi, Mitsuo, 4,685,341, Cl. 74-15.820.

Webasto-Werk W. Baier & Co.: *See—*
Stein, Friedrich, 4,685,616, Cl. 237-12.000.

Webb, Daniel D., to Peninsula Plastics Company, Inc. Nestable, stackable tote boxes. 4,685,567, Cl. 206-506.000.

Weber, Jean: *See—*
Philipp, Peter R.; and Weber, Jean, 4,685,284, Cl. 57-295.000.

Weber, Karl-Heinz: *See—*
Walther, Gerhard; Schneider, Claus; Weber, Karl-Heinz; and Fugner, Armin, 4,686,219, Cl. 514-220.000.

Weber, Neill: *See—*
Novak, Robert F.; and Weber, Neill, 4,686,320, Cl. 136-239.000.

Weber, Richard C., Jr.: *See—*
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Webster, R. D.: *See—*
Johnston, William D.; Czuba, Leonard; and Webster, R. D., 4,686,125, Cl. 428-35.000.

Webster Spring Co. Inc.: *See—*
Hagemeister, Robert C., 4,685,659, Cl. 267-103.000.

Wegemund, Bernd: *See—*
Erwied, Werner; Upadek, Horst; and Wegemund, Bernd, 4,686,255, Cl. 524-104.000.

Wegner, Paul C., to Tiegel Manufacturing Co. Apparatus for enveloping a battery plate by a dip process. 4,685,415, Cl. 118-58.000.

Wehr Corporation: *See—*
Barrett, William T., 4,686,034, Cl. 209-223.100.

Weiler, Rolf, to Alfred Teves GmbH. Sealing cap for a bolt guide of a spot-type disc brake. 4,685,686, Cl. 277-212.0FB.

Weise, Lutz: *See—*
Belart, Juan; Burgdorf, Jochen; Weise, Lutz; and Seibert, Wolfram, 4,685,747, Cl. 303-114.000.

Weiss, Frederick G.: *See—*
Li, Jim Y.; and Weiss, Frederick G., 4,686,451, Cl. 323-313.000.

Weitzel, Otto, to Robert Bosch GmbH. Method of increasing the dynamic range and reducing quantization noise of video signals. 4,686,568, Cl. 358-150.000.

Welker, Mark L.; and Stearns, Robert M. Temperature responsive cooling apparatus. 4,685,308, Cl. 62-171.000.

Weller, Albrecht: *See—*
Moravek, Peter; Trebitz, Bernd; Weller, Albrecht; and Amsel, Klaus, 4,685,229, Cl. 38-84.000.

Weller, Joseph F.: *See—*
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Wells, Norman B.: *See—*
Kowal, Leonard J.; Schwarz, Albert J.; and Wells, Norman B., 4,685,706, Cl. 285-322.000.

Wells, Thomas J.: *See—*
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Wenthold, David: *See—*
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Wenzel, Reinhard: *See—*
Pav, Josef; Wenzel, Reinhard; Svenka, Peter; and Rauf, Richard, 4,685,390, Cl. 100-168.000.

Wersing, Wolfram: *See—*
Kaarmann, Hans; Lubitz, Karl; Mohaupt, Jutta; Vogt, Martina; and Wersing, Wolfram, 4,686,409, Cl. 310-358.000.

West, John L.; Doane, Joseph W.; and Zumer, Slobodan. Liquid crystal display material comprising a liquid crystal dispersion in a thermoplastic resin. 4,685,771, Cl. 350-347.00V.

West, Jon K.: *See—*
Pensabene, Saverio F.; West, Jon K.; Leclair, Robert A.; Van Conant, Carl F.; Catotti, Arthur J.; and Fralick, William L., 4,686,013, Cl. 204-2.100.

Westcott, Brenda K.: *See—*
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Western Geophysical Company of America: *See—*
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Westinghouse Electric Corp.: *See—*
Crookston, Ronald W.; and Burney, Ivan T., 4,686,337, Cl. 200-148.00F.
Davis, Steven B., 4,686,461, Cl. 324-157.000.
Edwards, Charles W., 4,686,619, Cl. 363-126.000.
Glatthorn, Raymond H., 4,685,186, Cl. 29-157.400.
Goutzoulis, Anastasios P., 4,686,646, Cl. 364-845.000.
Hackstie, Louis F.; Briglia, Joseph F.; and Cohen, Albert, 4,686,403, Cl. 310-90.000.
Howland, Leland L.; and Seshadri, Jayaram, 4,685,306, Cl. 62-117.000.
Jabs, Robert H., 4,686,478, Cl. 324-420.000.
Kappenhagen, George A., 4,685,537, Cl. 187-103.000.
McCabria, Jack L., 4,685,354, Cl. 74-785.000.
McKee, Bobby D., 4,686,405, Cl. 310-178.000.
Murray, Alexander P.; Becker, Lawrence F., Jr.; Slater, Clifton G.; and Skriba, Michael C., 4,685,971, Cl. 134-2.000.
Sabatino, Raymond A., 4,685,511, Cl. 165-82.000.
Shuey, Kenneth C., 4,686,382, Cl. 307-149.000.

Wexler, Allan J.: *See—*
Resnick, Bruce M.; and Wexler, Allan J., 4,686,167, Cl. 430-264.000.

Wheel Trueing Tool Company: *See—*
Owens, Warren J., 4,685,440, Cl. 125-11.0CD.

White, Roger P., to North American Philips Corporation. Photosensitive electrophoretic displays. 4,686,524, Cl. 340-787.000.

Whitey Co.: *See—*
Corbin, Susan E.; Brown, Cal R.; Crozier, David W.; and Williams, Peter C., 4,685,488, Cl. 137-328.000.

Whitley, Donald C., to Don Whitley Scientific Limited. Producing anaerobic conditions. 4,686,188, Cl. 435-287.000.

Whitman, Robert D.: *See—*
Bailey, Frederick E., Jr.; Jorgenson, Michael W.; and Whitman, Robert D., 4,686,240, Cl. 521-103.000.

Whittal, John: *See—*
Heller, Harold H.; Oliver, Stephen N.; Whittal, John; Johncock, William; Darcy, Paul J.; and Trundle, Clive, 4,685,783, Cl. 351-163.000.

Whittle, Lee M. Irrigation channel gate. 4,685,828, Cl. 405-87.000.

Wick, Cyril, to Topshore Limited. Hatch for a boat. 4,685,411, Cl. 114-202.000.

Wiederaufarbeitungsanlage Karlsruhe Betriebsgesellschaft mbH: *See—*
Haberland, Karlheinz, 4,686,089, Cl. 422-159.000.

Wiedmann, Helmut; and Czech, Gunther, to Simro AG. Spectacles with fastening device. 4,685,781, Cl. 351-110.000.

Wiens, William S. Variable speed transmission. 4,685,898, Cl. 474-149.000.

Wiese, Jurgen: *See—*
Kiemle, Peter; Wiese, Jurgen; and Buxbaum, Gunter, 4,686,142, Cl. 428-403.000.

Wilkie, Bruce J., to International Business Machines Corporation. Call progress monitor for a computer telephone interface. 4,686,699, Cl. 379-93.000.

Wilkins, Jan: *See—*
Wilkins, Marcus J.; and Wilkins, Jan, 4,686,318, Cl. 800-1.000.

Wilkins, Marcus J.; and Wilkins, Jan. Kiwifruit plant. 4,686,318, Cl. 800-1.000.

Wilkinson, Stanley B.: *See*—
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Willard, G. Fred; Wait, Michael R.; Hutchings, David A.; and Lauderback, Sanford K., to Owens-Corning Fiberglas Corporation. Process for the continuous production of pipe from particulate materials. 4,685,873, Cl. 264-83.000.

Williams, David G.: *See*—
Harvey, Ian E.; Williams, David G.; Fisher, Barbara J.; and Johnson, Timothy J., 4,686,384, Cl. 307-202.100.

Williams, Donald E. Remotely controlled inflation/deflation valve system for a vehicle tire. 4,685,501, Cl. 152-417.000.

Williams, Donald J.; and Kammin, Marvin R., to Minnesota Mining and Manufacturing Company. Receptor sheet for thermal mass transfer printing. 4,686,549, Cl. 503-227.000.

Williams Electronics, Inc.: *See*—
Demar, Lawrence E.; and Ritchie, Steven S., 4,685,677, Cl. 273-121.00A.

Williams, Larry: *See*—
Paranto, Joseph N.; Wang, John H. S.; and Williams, Larry, 4,686,681, Cl. 372-82.000.

Williams, Peter C.: *See*—
Corbin, Susan E.; Brown, Cal R.; Crozier, David W.; and Williams, Peter C., 4,685,488, Cl. 137-328.000.

Williams, R. Bruce. Device for continuous in vivo measurement of blood glucose concentrations. 4,685,463, Cl. 128-632.000.

Williams, Robert M.: *See*—
Beckwith, Elaine C.; and Williams, Robert M., 4,686,095, Cl. 423-324.000.

Williams, Terrance L.: *See*—
Struss, Arthur W.; Williams, Terrance L.; and Eby, Lawrence T., 4,686,253, Cl. 524-44.000.

Williamson, Floyd L., to Intecolor Corporation. Power supply operable on varying inputs. 4,686,616, Cl. 363-21.000.

Williamson, Wilfred G., to Airmaster Sales Ltd. Reciprocating harrow with parker. 4,685,524, Cl. 172-54.500.

Williford, Kenneth A.: *See*—
Sheehan, Richard W.; and Williford, Kenneth A., 4,685,179, Cl. 28-248.000.

Wilson, Jerry F., to Manville Sales Corporation. Sleeve-type carrier. 4,685,566, Cl. 206-429.000.

Wilson, Linda S.: *See*—
Quinn, Daniel J.; Mulholland, Wayne A.; Bond, Robert H.; Olla, Michael A.; Cupples, Jerry S.; Tsitovsky, Ilya L.; Mozdzen, Barbara R.; Held, Charles F.; Wilson, Linda S.; and Nguyen, Yen T., 4,685,998, Cl. 156-633.000.

Wilson, Louis D.; Jones, Patrick M.; and Vrilakas, Mark. Work station for working on workpieces for a plurality of operations. 4,685,333, Cl. 73-478.000.

Wilson, Stephen T.: *See*—
Flanigen, Edith M.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., 4,686,093, Cl. 423-306.000.

Windmoller & Holscher: *See*—
Lubke, Herbert, 4,685,182, Cl. 29-116.00R.

Wisconsin Alumni Research Foundation: *See*—
Sugden, William M., 4,686,186, Cl. 435-243.000.

Wise, Ann E.: *See*—
Kottman, Rickie A.; Terrill, Robert E.; and Wise, Ann E., 4,685,975, Cl. 134-33.000.

Wisotsky, Max J.; Bloch, Ricardo; Brownawell, Darrell W.; Chen, Frank J.; and Gutierrez, Antonio, to Exxon Research & Engineering Co. Succinimide lubricating oil dispersant. 4,686,054, Cl. 252-32.70E.

Wisse, Otto: *See*—
Schulenberg, Heinrich; and Wisse, Otto, 4,685,204, Cl. 29-726.000.

Wittig, W.: *See*—
Cremer, Heinz P.; Wittig, W.; and Voss, Hans W., 4,685,727, Cl. 297-180.000.

Wodnicki, Tomasz J. Postage stamp dispenser. 4,685,994, Cl. 156-517.000.

Wohlmuth, Clinton J.: *See*—
Johns, Kent I.; and Wohlmuth, Clinton J., 4,686,348, Cl. 219-121.0PY.

Wolf, Karlheinz: *See*—
Wolff, Joachim; Wolf, Karlheinz; and Marschner, Werner, 4,685,933, Cl. 8-527.000.

Wolf, Kenneth E. Level sensing unit and a level indicating device based thereon. 4,685,218, Cl. 33-366.000.

Wolff, Joachim; Wolf, Karlheinz; and Marschner, Werner, to Bayer Aktiengesellschaft. Concentrated reactive dyestuff solutions containing cyanamide compound as stabilizer. 4,685,933, Cl. 8-527.000.

Wolff, Robert C. Method of transporting large diameter particulate matter. 4,685,840, Cl. 406-47.000.

Wolpert, George H., Jr., to McKesson Corporation. Modified geriatric chair. 4,685,726, Cl. 297-150.000.

Wong, Mon N.: *See*—
Chang, Donald C. D.; and Wong, Mon N., 4,686,493, Cl. 333-113.000.

Wong, Thomas S., to Advanced Micro Devices, Inc. Reference-voltage source for replicating a terminal voltage of a saturated transistor. 4,686,452, Cl. 323-314.000.

Wood, Clayton D.; Edwards, David S.; Jung, Chu W.; Garrou, Philip E.; Gleason, Edward F., III; Kohatsu, Iwao; Hucul, Dennis A.; and Read, Arthur E., Jr., to Dow Chemical Company, The. Catalysts having alkoxide-modified supports. 4,686,314, Cl. 585-260.000.

Wood, George N.; and Spector, George. Slip stick. 4,685,215, Cl. 33-161.000.

Wood, Kenneth W.: *See*—
McCanny, John V.; McWhirter, John G.; and Wood, Kenneth W., 4,686,645, Cl. 364-754.000.

Woods, Timothy N.; and Frye, Richard D., to Garland, Robert E.; and Woods, Timothy N. Arch door marking gauge. 4,685,216, Cl. 33-176.000.

Workman, Gary L., to Deslauriers, Inc. Box void. 4,685,267, Cl. 52-577.000.

World Tech Fibres, Inc.: *See*—
Sheehan, Richard W.; and Williford, Kenneth A., 4,685,179, Cl. 28-248.000.

Worns, John R.; Farber, Milton; and Hughes, David T., to Uniroyal Plastics Co., Inc.; and Royalite Plastics Limited. Photosensitive elastomeric composition for flexographic printing plates having improved softness. 4,686,172, Cl. 430-286.000.

Worthen, Steven J.; and Oursler, James D., to Hughes Tool Company-USA. Method of hardfacing steel bodied bits. 4,685,359, Cl. 76-108.00A.

Wozniak, Walter E.: *See*—
Garner, Gerald D.; and Wozniak, Walter E., 4,685,966, Cl. 73-583.000.

Wray, Daniel X., to Dynamic Disk. Substrate material for magnetic recording media. 4,686,151, Cl. 428-607.000.

Wulf, Peter: *See*—
Ahlf, Heinz-Jurgen; Guhne, Wieland; Simm, Hans-Peter; and Wulf, Peter, 4,685,170, Cl. 15-367.000.

Wullbrandt, Dieter: *See*—
Keil, Karl-Heinz; Wullbrandt, Dieter; Keller, Reinhold; and Engelhardt, Friedrich, 4,686,243, Cl. 521-149.000.

Wunder, William G.: *See*—
Scheflow, Oliver W.; Roblin, William J., III; Kirsch, Richard C.; and Wunder, William G., 4,685,364, Cl. 83-68.000.

Wurst, Karl-Heinz, to Arnold Muller GmbH & Co KG. Drive device for inducing swinging, rotation and linear movements. 4,686,402, Cl. 310-83.000.

Xebec Development Partners, Ltd.: *See*—
Bryer, Philip, 4,686,595, Cl. 360-106.000.

Xedar Corporation: *See*—
Bucher, Hans R., 4,686,566, Cl. 358-113.000.

Xerox Corporation: *See*—
Law, Simon M.; and Ngo, Thien M., 4,686,396, Cl. 307-473.000.
Yip, Kwok-Leung; Antos, Ronald L.; and Herloski, Robert P., 4,686,542, Cl. 346-108.000.

Yabe, Masao: *See*—
Tani, Yoshio; Yabe, Masao; and Naruo, Kyoichi, 4,686,543, Cl. 346-137.000.

Yaeger, Ivan. Artificial arm and hand assembly. 4,685,928, Cl. 623-64.000.

Yagi, Toshihiko; Yamazaki, Katsumasa; Michiue, Kenji; Mochizuki, Yoshiharu; and Goto, Sohei, to Konishiroku Photo Industry Co., Ltd. Multilayer multi-color photographic material. 4,686,176, Cl. 430-506.000.

Yagishita, Koichi; Iriyama, Yasunori; and Hirose, Mitsumasa, to Kabushiki Kaisha Yagishita. Batch type filter system. 4,686,043, Cl. 210-387.000.

Yamada, Kazuyoshi: *See*—
Sato, Fumihiko; and Yamada, Kazuyoshi, 4,686,395, Cl. 307-455.000.

Yamada, Masatoshi: *See*—
Saito, Akinori; Yamada, Masatoshi; Imai, Kenji; Kawamura, Kiyomi; and Kimura, Masanobu, 4,685,432, Cl. 123-276.000.

Yamada, Minoru; Usui, Mitsuru; Masaki, Akira; Nakanishi, Keiichirou; and Tokuda, Masahide, to Hitachi, Ltd. Device for cooling integrated circuit chip. 4,686,606, Cl. 361-385.000.

Yamada, Toshio: *See*—
Sato, Takashi; and Yamada, Toshio, 4,685,980, Cl. 148-304.000.

Yamagishi, Masaaki: *See*—
Inoue, Yasuo; Yonekubo, Ken; Yamagishi, Masaaki; and Endo, Itaru, 4,685,776, Cl. 350-502.000.

Yamaguchi, Nobutaka: *See*—
Ryoke, Katsumi; Yamaguchi, Nobutaka; Takahashi, Masatoshi; Hanai, Kazuko; Kosha, Hideaki; and Tadokoro, Eiichi, 4,686,139, Cl. 428-323.000.

Yamaguchi, Tetsuo: *See*—
Tominaga, Haruo; Takayama, Teruyuki; Ogura, Yoshio; and Yamaguchi, Tetsuo, 4,686,153, Cl. 428-610.000.

Yamaha: *See*—
Kubota, Kazuhiro; and Kondo, Seiji, 4,685,431, Cl. 123-198.0DB.
Oyaizu, Takeshi, 4,685,429, Cl. 123-90.310.

Yamakawa, Tsuneo: *See*—
Saida, Toyoyasu; Sunagawa, Takahisa; Yamakawa, Tsuneo; Ohta, Norima; and Obara, Keishi, 4,686,068, Cl. 252-632.000.

Yamamoto, Nobuaki: *See*—
Sato, Yoshihiko; and Yamamoto, Nobuaki, 4,686,413, Cl. 313-346.00R.

Yamamoto, Saburo: *See*—
Yano, Seiki; Yamamoto, Saburo; Hayashi, Hiroshi; and Morimoto, Taiji, 4,686,679, Cl. 372-48.000.

Yamamoto, Shigeo, to Honda, Keisuke. Color sonar system for displaying echo signals from fish. 4,686,659, Cl. 367-87.000.

Yamamoto, Takemi; and Miki, Yasuhiro, to Brother Kogyo Kabushiki Kaisha. Apparatus for dot-matrix printing of characters missing from a type carrier. 4,685,814, Cl. 400-82.000.

Yamanaka, Junichi, to Kabushiki Kaisha Toshiba. Gamma correction circuit. 4,686,562, Cl. 358-32.000.

Yamane, Masayuki, to University of Rochester. Method and composition for the manufacture of gradient index glass. 4,686,195, Cl. 501-12.000.

Yamanouchi, Kouichi: *See*—
Scherer, Kirby V., Jr.; Ono, Taizo; Yamanouchi, Kouichi; and Yokoyama, Kazumasa, 4,686,024, Cl. 204-157.950.

Yamanouchi Pharmaceutical Co., Ltd.: *See*—
Konno, Yutaka; Kawata, Hiroitsu; Aruga, Masayoshi; Sonobe, Takashi; and Mitomi, Mitsuo, 4,685,911, Cl. 604-897.000.

Yamaoka, Shigemitsu, to Nippon Gakki Seizo Kabushiki Kaisha. Digital color encoder. 4,686,520, Cl. 340-703.000.

Yamasaki, Toshio: *See*—
Beny, Janos; and Yamasaki, Toshio, 4,685,894, Cl. 446-435.000.

Yamashita, Takashi: *See*—
Okubo, Kunio; and Yamashita, Takashi, 4,685,657, Cl. 266-234.000.

Yamauchi, Akira: *See*—
Kono, Masao; Komeno, Taichitro; Ishihara, Shoichi; Yamauchi, Akira; and Okabayashi, Tadashi, 4,686,179, Cl. 435-7.000.

Yamazaki, Katsumasa: *See*—
Yagi, Toshihiko; Yamazaki, Katsumasa; Michiue, Kenji; Mochizuki, Yoshiharu; and Goto, Sohei, 4,686,176, Cl. 430-506.000.

Yanazawa, Tadaaki; Tanaka, Teruaki; Noda, Akio; Takeda, Ryo; and Inoue, Masataka, to Kawasaki Steel Corporation. Method of rolling steel rods and wires with grooveless rolls and grooveless rolling entry guide. 4,685,320, Cl. 72-250.000.

Yanko, Kenneth C. Heat exchanger. 4,685,441, Cl. 126-116.00R.

Yano, Seiki; Yamamoto, Saburo; Hayashi, Hiroshi; and Morimoto, Taiji, to Sharp Kabushiki Kaisha. Window VSIS semiconductor laser. 4,686,679, Cl. 372-48.000.

Yano, Takashi: *See*—
Murayama, Jin; Kondo, Ryuji; Tamayama, Hiroshi; Yano, Takashi; and Shizukuishi, Makoto, 4,686,573, Cl. 358-213.220.

Yashima Chemical Industrial Co., Ltd.: *See*—
Takematsu, Tetsuo; Suzuki, Akinori; Toda, Kazuya; and Goto, Masuo, 4,685,962, Cl. 71-118.000.

Yashiro, Sadao: *See*—
Washizuka, Syoichi; Watanabe, Masayuki; Yashiro, Sadao; and Nakanishi, Masae, 4,686,091, Cl. 422-249.000.

Yasuda, Takeru: *See*—
Ando, Tsuneo; Kasuya, Kazusato; Yasuda, Takeru; and Asada, Yukitoshi, 4,685,434, Cl. 123-438.000.

Yasui, Masaru: *See*—
Suda, Fumiyuki; Yasui, Masaru; and Miyamoto, Kazuhiro, 4,686,165, Cl. 430-69.000.

Yasumuro, Hisakazu: *See*—
Matsuno, Kenji; Yasumuro, Hisakazu; Taira, Kazuo; Imatani, Tsuneo; and Toyoshima, Makoto, 4,685,989, Cl. 156-244.130.

Yates, Roy E. Protective apparatus for artists. 4,685,644, Cl. 248-118.300.

Yatsugake, Yasuo: *See*—
Saito, Susumu; Suzuki, Michio; Suda, Kyo; Yatsugake, Yasuo; and Tsukada, Kazuya, 4,685,802, Cl. 356-339.000.

Yazu, Shuji: *See*—
Hara, Akira; Miyake, Masaya; and Yazu, Shuji, 4,686,080, Cl. 419-8.000.

Yeh, Shih-Yuan. Clicker-type brake for fly-fishing reel. 4,685,632, Cl. 242-84.51R.

Yip, Kwok-Leung; Antos, Ronald L.; and Herloski, Robert P., to Xerox Corporation. High speed, high resolution raster output scanner. 4,686,542, Cl. 346-108.000.

Yohner, Paul A.: *See*—
Scobie, William B.; and Yohner, Paul A., 4,685,611, Cl. 251-306.000.

Yokoi, Hiroshi: *See*—
Iwasa, Tadanobu; and Yokoi, Hiroshi, 4,686,122, Cl. 427-388.300.

Yokoi, Masakatsu; and Harada, Tsutomu, to Dainippon Screen Mfg. Co., Ltd. Picture scanning and recording using a photoelectric focusing system. 4,686,359, Cl. 250-201.000.

Yokoi, Shinichi: *See*—
Mure, Hiroshi; Mizoguchi, Ryohei; Yokoi, Shinichi; Fujihara, Shigeru; and Ichikawa, Kaoru, 4,686,687, Cl. 373-22.000.

Yokokawa, Tomohisa: *See*—
Iwasaki, Hideki; Yokokawa, Tomohisa; and Kurosaki, Masanori, 4,686,707, Cl. 455-200.000.

Yokose, Kazutoshi: *See*—
Nagai, Masahide; and Yokose, Kazutoshi, 4,685,862, Cl. 414-744.00A.

Yokoyama, Kageki; and Amano, Itaru, to Kabushiki Kaisha Kobe Seiko Sho. Mold clamping mechanism for tire curing machines. 4,686,129, Cl. 425-47.000.

Yokoyama, Kazumasa: *See*—
Scherer, Kirby V., Jr.; Ono, Taizo; Yamanouchi, Kouichi; and Yokoyama, Kazumasa, 4,686,024, Cl. 204-157.950.

Yokoyama, Mamoru: *See*—
Kanamori, Jun; and Yokoyama, Mamoru, 4,686,173, Cl. 430-313.000.

Yokoyama, Takeshi. Condensate separating and discharging device with apertured float cover. 4,685,486, Cl. 137-179.000.

Yonekubo, Ken: *See*—
Inoue, Yasuo; Yonekubo, Ken; Yamagishi, Masaaki; and Endo, Itaru, 4,685,776, Cl. 350-502.000.

Yonovich, John R., to Caldwell Manufacturing Company. Spring system for double-hung window sash. 4,685,175, Cl. 16-197.000.

Yorinobu, Takino: *See*—
Sakuichi, Sakakibara; Yoshiaki, Tokuda; Tamio, Nagai; Yorinobu, Takino; and Tomiro, Arai, 4,685,810, Cl. 366-150.000.

Yoshiaki, Tokuda: *See*—
Sakuichi, Sakakibara; Yoshiaki, Tokuda; Tamio, Nagai; Yorinobu, Takino; and Tomiro, Arai, 4,685,810, Cl. 366-150.000.

Yoshida, Hirohiko; and Natori, Minoru, to Citizen Watch Co. Ltd. Multicolor picture display device. 4,686,519, Cl. 340-701.000.

Yoshida Kogyo K. K.: *See*—
Sassa, Yuusei, 4,685,207, Cl. 29-708.000.

Yoshida, Masashi: *See*—
Takashima, Kiyoshi; Suzuki, Isao; Yoshida, Masashi; Tanaka, Ryutatsu; Masumitsu, Noriyuki; Kinoshita, Kazuhiro; and Ishii, Hiromi, 4,686,081, Cl. 420-29.000.

Yoshida, Noboru, to Hosiden Electronics Co., Ltd. Connector plug. 4,685,758, Cl. 439-606.000.

Yoshikawa, Koichi: *See*—
Kobayashi, Jiro; and Yoshikawa, Koichi, 4,685,206, Cl. 29-740.000.

Yoshikawa, Tadao; and Nagata, Shiro, to Kuraray Co., Ltd. Optical information recording medium. 4,686,143, Cl. 428-411.100.

Yoshimoto, Tokuji: *See*—
Inagaki, Takashi; Shimada, Toshio; and Yoshimoto, Tokuji, 4,685,428, Cl. 123-52.00A.

Yoshimura, Tsuyoshi, to Ricoh Company, Ltd. Document scanning apparatus. 4,685,795, Cl. 355-8.000.

Yoshino, Akira; and Sanechika, Kenichi, to Asahi Kasei Kogyo Kabushiki Kaisha. Polyacethylene composite process for production thereof, and method for use thereof. 4,686,160, Cl. 429-50.000.

Yoshino, Kimiaki; Ando, Eiji; Miyazaki, Jinsei; and Morimoto, Kazuhisa, to Matsushita Electric Industrial Co., Ltd. Optical recording medium and production of the same. 4,686,169, Cl. 430-339.000.

Yoshitsugu, Noritada: *See*—
Tsuge, Hiroshi; Fujiwara, Akinori; and Yoshitsugu, Noritada, 4,685,741, Cl. 297-467.000.

Yoshiyama, Toshio: *See*—
Iseki, Masahide; Yoshiyama, Toshio; Kajita, Hiroshi; Itakiyo, Masanori; Kusumoto, Hiroshi; Kawamori, Yoshizo; and Kawamoto, Masuo, 4,685,792, Cl. 355-3.0SH.

Yosida, Ethuo, to Ohara Paragium Chemical Co., Ltd. Adhesive composition. 4,686,247, Cl. 523-213.000.

Young, Chung C.; Coleman, Robert L.; Sullivan, Sheila M.; Grimes, John F.; Baumeister, Ferdnand; MacIndoe, Robert; Catalano, Lou; Coppola, Pat; Spaziani, Fred; Rodomista, Guy; and Fowler, James E. Apparatus and control kit for analyzing blood sample values including hematocrit. 4,686,479, Cl. 324-439.000.

Young, Donald C., to Union Oil Co. of California. Electrolytic bath and methods of use. 4,686,017, Cl. 204-45.100.

Young, Hartley F., to Ralph McKay Limited. Rail fastening systems. 4,685,618, Cl. 238-310.000.

Young, Jerald A.: *See*—
Johnson, Charles A.; and Young, Jerald A., 4,686,639, Cl. 364-559.000.

Young, Raymond R.; Deffner, John F.; and Barnes, Russell M., to Visual Marketing Inc. Shelf-supported expandable gravity feed system. 4,685,574, Cl. 211-59.200.

Youssefyeh, Raymond D.; Skiles, Jerry W.; Suh, John T.; and Jones, Howard, to USV Pharmaceutical Corporation. N-carboxy anhydride intermediates. 4,686,295, Cl. 548-226.000.

Yuguchi, Sadao. Reinforcing bar binding device. 4,685,493, Cl. 140-119.000.

Yun, Kyung W.; Jones, Othel L.; and Long, Gerald M., to Copeland Corporation. Valve assembly and compressor modulation apparatus. 4,685,489, Cl. 137-543.150.

Yung, Kwong Y. Closable, collapsible umbrella for one-hand operation. 4,685,482, Cl. 135-24.000.

Yusa, Atsushi; Nishizawa, Jun-ichi; Suzuki, Sohbe; and Tamamushi, Takashige, to Olympus Optical Co., Ltd. Solid state image sensor. 4,686,555, Cl. 357-30.000.

Zahavi, Joseph: *See*—
Halliwell, Michael J.; and Zahavi, Joseph, 4,686,114, Cl. 427-53.100.

Zahnradfabrik Friedrichshafen AG: *See*—
Ehrlinger, Friedrich J.; Muller, Franz; Simon, Herbert; and Sailer, Hubert, 4,685,343, Cl. 74-331.000.
Holtermann, Otto; Torbusch, Klaus; and Bieber, Gerold, 4,685,548, Cl. 192-0.080.

Zalman, Zaharia. Foldable framework and portable objects having such a framework. 4,685,161, Cl. 5-82.00R.

Zambias, Robert A.: *See*—
Chang, Michael N.; Jensen, Norman P.; Hammond, Milton L.; Zambias, Robert A.; McDonald, John; and Rupprecht, Kathleen M., 4,686,235, Cl. 514-520.000.

Zaremba, Krzysztof: *See*—
Dziewanowski, Andre ; Piotrowski, Krzysztof; and Zaremba, Krzysztof, 4,686,075, Cl. 264-209.200.

Zarr, Lewis E.: *See*—
Rubin, Richard H.; Hillman, Gary; Zarr, Lewis E.; and Hayes, William K., 4,685,852, Cl. 414-404.000.

Zehl, Hermann: *See*—
Schneider, Arthur; Baum, Walter; and Zehl, Hermann, 4,686,530, Cl. 340-870.310.

Zeiders, Glenn: *See*—
Hoag, Ethan; and Zeiders, Glenn, 4,686,680, Cl. 372-58.000.

Zeiler, Hans-Joachim: *See*—
Angerbauer, Rolf; Boberg, Michael; Metzger, Karl G.; and Zeiler, Hans-Joachim, 4,686,216, Cl. 514-202.000.

Lockhoff, Oswald; Krüger, Bernd-Wieland; Stadler, Peter; Paessens, Arnold; Streissle, Gert; Taylor, Peter; Zeiler, Hans-Joachim; and Metzger, Karl-Georg, 4,686,208, Cl. 514-42.000.

Zenith Electronics Corporation: *See*—
Costello, Louis B., 4,686,614, Cl. 363-17.000.
Dougherty, Lawrence W.; and Strauss, Paul, 4,686,416, Cl. 313-407.000.
Fendley, James R., 4,686,429, Cl. 315-368.000.
Strauss, Paul, 4,686,415, Cl. 313-402.000.

Zetek, Inc.: *See*—
Regas, Jennine; and Fernando, Ranjit S., 4,685,471, Cl. 128-734.000.

Zimmerman, Garyx; and Dickenson, Donald E. Sweetener composition and method. 4,686,107, Cl. 426-548.000.

Zingher, Arthur R.: *See*—
Flint, Ephraim B.; Gruber, Peter A.; Marks, Ronald F.; Olive, Graham; and Zingher, Arthur R., 4,685,606, Cl. 228-123.000.

Zinkin, Harold. Elastic tension exercising apparatus with multiple pass cable and pulley. 4,685,670, Cl. 272-136.000.

Ziolkowski, Jurgen, to Jurid Werke. Support plate for a friction lining of a disc brake. 4,685,543, Cl. 188-73.100.

Zoerb, Melvin C., to Boeing Company, The. Control system for aircraft wheel brakes and method. 4,685,748, Cl. 303-115.000.

Zoetman, Herman; and Verbeek, Robert J. M., to U.S. Philips Corporation. Clock signal arrangement for regenerating a clock signal. 4,686,482, Cl. 328-164.000.

Zuber, Bretislav P., to Northern Telecom Limited. Lifting and tilting device. 4,685,711, Cl. 294-86.410.

Zumer, Slobodan: *See*—
West, John L.; Doane, Joseph W.; and Zumer, Slobodan, 4,685,771, Cl. 350-347.00V.

Zwart, Bernardus M., Jr., to Nuclear Energy Services, Inc. Method and apparatus for displacing a reactor weld scanner assembly by variable buoyancy. 4,686,078, Cl. 376-249.000.

Zwick Energy Research Organization, Inc.: *See*—
Brigham, William D.; and Nguyen, Dinh, 4,685,292, Cl. 60-320.000.

Zygo Corporation: *See*—
Sommargren, Gary E., 4,685,803, Cl. 356-361.000.

501 Rubik Studio: *See*—
Rubik, Erno, 4,685,680, Cl. 273-155.000.
Rubik, Erno; and Fai, Cheung K., 4,685,681, Cl. 273-155.000.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 11TH DAY OF AUGUST, 1987

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Borg-Warner Chemicals, Inc.: *See*—
Halpern, Yuval, Re. 32,472, Cl. 524-100.000.
Mott, Donna, Re. 32,473, Cl. 524-118.000.

Fish, David W.: *See*—
Merritt, David T.; Fish, David W.; and Long, Olen R., Re. 32,469, Cl. 166-117.500.

Halpern, Yuval, to Borg-Warner Chemicals, Inc. Flame-retardant polymer compositions containing amine salts. Re. 32,472, Cl. 524-100.000.

Keller, Arnold, to Waldemar Link GmbH & Co. Hip joint prosthesis with a shaft to be fitted into the medullary canal of the femur. Re. 32,471, Cl. 53-23.000.

Long, Olen R.: *See*—
Merritt, David T.; Fish, David W.; and Long, Olen R., Re. 32,469, Cl. 166-117.500.

Lucas Girling Limited: *See*—
Wright, Andrew C. W., Re. 32,470, Cl. 188-73.440.

Merritt, David T.; Fish, David W.; and Long, Olen R., to Otis Engineering Corporation. Side pocket mandrel. Re. 32,469, Cl. 166-117.500.

Mott, Donna, to Borg-Warner Chemicals, Inc. Flame-retardant polymer compositions containing metal salts. Re. 32,473, Cl. 524-118.000.

Otis Engineering Corporation: *See*—
Merritt, David T.; Fish, David W.; and Long, Olen R., Re. 32,469, Cl. 166-117.500.

Reid, Dennis. Variable time delay apparatus for controlling the start of a vehicle. Re. 32,474, Cl. 307-10.00R.

Waldemar Link GmbH & Co.: *See*—
Keller, Arnold, Re. 32,471, Cl. 53-23.000.

Wright, Andrew C. W., to Lucas Girling Limited. Disc brakes for vehicles. Re. 32,470, Cl. 188-73.440.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Clad Metals, Inc.: *See*—
Ulam, John B., B1 4,004,892, Cl. 428-652.000.

St. Clair, David J., to Shell Oil Company. Assymetric block copolymers and corresponding adhesive formulations. B1 4,444,953, 8-11-87, Cl. 525-98.000.

Shell Oil Company: *See*—
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148 F 4,686,337
264 4,686,338
339 4,686,339

CLASS 201

3 4,686,007

CLASS 202

118 4,686,008
176 4,686,009

CLASS 203

63 4,686,010

CLASS 204

1 T 4,686,011
4,686,012
1.5 4,686,019
2.1 4,686,013
15 4,686,014
4,686,015
25 4,686,016
45.1 4,686,017
59 R 4,686,018
129.1 4,686,020
129.75 4,686,021
157.41 4,686,022
157.67 4,686,023
157.95 4,686,024
245 4,686,025
252 4,686,026

CLASS 206

1.5 4,685,558
38 4,685,559
287.1 4,685,560
315.6 4,685,561
328 4,685,562
4,685,563
354 4,685,564
427 4,685,565
429 4,685,566
506 4,685,567
561 4,685,568
579 4,685,570
583 4,685,571

CLASS 208

39 4,686,027
86 4,686,028
111 4,686,029
216 PP 4,686,030

CLASS 209

2 4,686,031
8 4,686,032
167 4,686,033
223.1 4,686,034
571 4,685,569

CLASS 210

137 4,686,035
177 4,686,036
221.2 4,686,037
232 4,686,038
321.1 4,686,039
331 4,686,040
335 4,686,041
386 4,686,042
387 4,686,043
500.22 4,686,044
620 4,686,045
651 4,686,046
712 4,686,047
771 4,686,048
774 4,686,049

CLASS 211

4 4,685,572
46 4,685,573
59.2 4,685,574
90 4,685,575
189 4,685,576

CLASS 215

11 D 4,685,577
230 4,685,578
4,685,579
260 4,685,580

CLASS 219

10.77 4,686,340
54 4,686,341
58 4,686,342
69 W 4,686,343
4,686,344
76.14 4,686,345
110 4,686,346
117.1 4,686,347
121 L 4,686,349
121 PY 4,686,348
130.51 4,686,350
216 4,686,351
250 4,686,352
275 4,686,353
301 4,686,354
385 4,686,355
482 4,686,356

CLASS 220

3.2 4,685,581
66 4,685,582
94 R 4,685,583
204 4,685,584
256 4,685,585
305 4,685,586
316 4,685,587
428 4,685,588
465 4,685,589

CLASS 221

241 4,685,590

CLASS 222

107 4,685,591
148 4,685,592
168.5 4,685,593
182 4,685,594
326 4,685,595
389 4,685,596
4,685,597
400.7 4,685,598

CLASS 224

170 4,685,599
203 4,685,600
261 4,685,601

CLASS 225

93 4,685,602

CLASS 227

6 4,685,603
18 4,685,604

CLASS 228

37 4,685,605
123 4,685,606
193 4,685,607
227 4,685,608

CLASS 229

15 4,685,609
23 R 4,685,610

CLASS 232

35 4,685,612

CLASS 234

131 4,685,613

CLASS 235

379 4,686,357
382 4,686,358

CLASS 236

78 D 4,685,614
94 4,685,615

CLASS 237

12 4,685,616
81 4,685,617

CLASS 238

310 4,685,618

CLASS 239

1 4,685,619
3 4,685,620
288 4,685,621
346 4,685,622

CLASS 241

21 4,685,623
36 4,685,624
4,685,625
4,685,626
169.1 4,685,627
236 4,685,628

CLASS 242

18 R 4,685,629
35.5 A 4,685,630
47 4,685,631
84.51 R 4,685,632
85 4,685,633
96 4,685,634
107.4 A 4,685,635
129 4,685,636
157 R 4,685,637
199 4,685,638

CLASS 244

3.22 4,685,639
29 4,685,640
105 4,685,641
153 A 4,685,642
199 4,685,643

CLASS 248

118.3 4,685,644
188.8 4,685,645
225.31 4,685,646
444.1 4,685,647
572 4,685,648
594 4,685,649

CLASS 249

83 4,685,650

CLASS 250

201 4,686,359
4,686,360
221 4,686,361
231 SE 4,686,362
235 4,686,363
256 4,686,364
281 4,686,365
287 4,686,366
290 4,686,367
374 4,686,368
385 4,686,369
423 R 4,686,370
461.1 4,686,371
461.2 4,686,372
571 4,686,374
578 4,686,373

CLASS 251

11 4,685,651
4,685,652
63.6 4,685,653
205 4,685,654
282 4,685,655
306 4,685,611

CLASS 252

8.551 4,686,051
4,686,052
8.554 4,686,053
8.8 4,686,050
32.7 E 4,686,054
4,686,055
49.7 4,686,056
62 4,686,057
75 4,686,058
4,686,059
90 4,686,060
95 4,686,061
99 4,686,062
102 4,686,063
153 4,686,064
159 4,686,065
344 4,686,066
626 4,686,067
632 4,686,068

CLASS 256

13.1 4,685,656

CLASS 261

92 4,686,069

CLASS 264

1.2 4,686,070
27 4,686,071
29.5 4,686,072
83 4,685,873
102 4,686,073
171 4,686,074
209.2 4,686,075
268 4,686,076

CLASS 266

234 4,685,657

CLASS 267

80 4,685,658
103 4,685,659

CLASS 269

7 4,685,660
20 4,685,661
43 4,685,662
244 4,685,663

CLASS 271

227 4,685,664

CLASS 272

67 4,685,665
70 4,685,666
71 4,685,667
123 4,685,668
130 4,685,669
136 4,685,670
139 4,685,671

CLASS 273

1 GC 4,685,673
1 R 4,685,672
40 4,685,674
73 C 4,685,675
73 D 4,685,676
121 A 4,685,677
148 B 4,685,678
153 R 4,685,679
155 4,685,680
4,685,681
162 R 4,685,682

CLASS 277

1 4,685,683
57 4,685,684
205 4,685,685
212 FB 4,685,686

CLASS 279

119 4,685,687

CLASS 280

30 4,685,688
112 A 4,685,690
204 4,685,691
234 4,685,692
242 WC 4,685,693
270 4,685,694
423 B 4,685,695
625 4,685,696
637 4,685,697
707 4,685,689
4,685,698

CLASS 281

15 R 4,685,699
21 R 4,685,700
42 4,685,701

CLASS 283

81 4,685,702

CLASS 285

47 4,685,703
109 4,685,704
177 4,685,705
322 4,685,706
328 4,685,707
374 4,685,708

CLASS 290

2 4,686,375
4,686,378
42 4,686,376
53 4,686,377

CLASS 292

67 4,685,710
201 4,685,709

CLASS 293

128 4,685,712

CLASS 294

81.2 4,685,714
86.41 4,685,711
90 4,685,713

CLASS 296

1 S 4,685,715
63 4,685,716
97 A 4,685,717
97 H 4,685,723
154 4,685,718
156 4,685,719
181 4,685,720
4,685,721
188 4,685,722
216 4,685,724

CLASS 297

35 4,685,732
45 4,685,725
150 4,685,726
180 4,685,727
184 4,685,728
193 4,685,729
284 4,685,733
316 4,685,730
347 4,685,731
355 4,685,734
362 4,685,735
366 4,685,736
408 4,685,737
452 4,685,738
4,685,739
467 4,685,741
468 4,685,740

CLASS 299

8 4,685,742

CLASS 301

44 T 4,685,743

CLASS 303

15 4,685,750
89 4,685,744
100 4,685,745
106 4,685,746
114 4,685,747
115 4,685,748
116 4,685,749

CLASS 307

10 R Re.32,474
31 4,686,393
66 4,686,379
125 4,686,380
147 4,686,381
149 4,686,382
200 B 4,686,383
202.1 4,686,384
261 4,686,385
269 4,686,386
296 R 4,686,387
4,686,388
351 4,686,389
4,686,390
354 4,686,391
448 4,686,392
455 4,686,394
4,686,395
473 4,686,396

CLASS 310

36 4,686,397
41 4,686,398
62 4,686,399
67 R 4,686,400
68 E 4,686,401
83 4,686,402
90 4,686,403
90.5 4,686,404
178 4,686,405
322 4,686,406
323 4,686,407
334 4,686,408
358 4,686,409

CLASS 312

263 4,685,751

CLASS 313

113 4,686,410
271 4,686,411
344 4,686,412
346 R 4,686,413
362.1 4,686,414
402 4,686,415
407 4,686,416
479 4,686,417
512 4,686,418
641 4,686,419

CLASS 315

15 4,686,420
73 4,686,421
74 4,686,422
82 4,686,423
86 4,686,424
152 4,686,425
169.3 4,686,426
219 4,686,427
307 4,686,428
368 4,686,429
371 4,686,430
399 4,686,431
403 4,686,432

CLASS 318

50 4,686,433
52 4,686,434
135 4,686,435
254 4,686,436
4,686,437
280 4,686,438
335 4,686,439
646 4,686,440

CLASS 320

2 4,686,441
17 4,686,442
23 4,686,443
31 4,686,444
61 4,686,445

CLASS 322

33 4,686,446

CLASS 323

210 4,686,447
212 4,686,448
231 4,686,449
282 4,686,450
313 4,686,451

314 4,686,452

CLASS 324

65 R 4,686,453
67 4,686,454
73 R 4,686,455
4,686,456
77 R 4,686,457
83 D 4,686,458
132 4,686,459
142 4,686,460
157 4,686,461
158 F 4,686,467
4,686,468
158 P 4,686,463
4,686,464
4,686,465
158 R 4,686,462
4,686,466
204 4,686,469
207 4,686,470
243 4,686,471
252 4,686,472
320 4,686,473
331 4,686,474
349 4,686,475
350 4,686,476
366 4,686,477
420 4,686,478
439 4,686,479

CLASS 328

62 4,686,480
133 4,686,481
164 4,686,482
165 4,686,483

CLASS 329

109 4,686,484

CLASS 330

4.3 4,686,485
107 4,686,486
288 4,686,487

CLASS 331

2 4,686,488
57 4,686,489

CLASS 332

1 4,686,490

CLASS 333

21 A 4,686,491
33 4,686,492
113 4,686,493
137 4,686,494
156 4,686,495
202 4,686,496
230 4,686,499
253 4,686,497
260 4,686,498

CLASS 335

128 4,686,500
256 4,686,501

CLASS 337

252 4,686,502

CLASS 340

71 4,686,503
328 4,686,504
331 4,686,505
347 AD 4,686,507
4,686,508
4,686,511
347 DA 4,686,509
347 DD 4,686,506
4,686,512
347 P 4,686,510
571 4,686,514
572 4,686,513
4,686,515
4,686,516
4,686,517
664 4,686,518
701 4,686,519
703 4,686,520
4,686,521
709 4,686,522
4,686,523
787 4,686,524
790 4,686,525
825.06 4,686,526
825.34 4,686,527
825.44 4,686,528
825.69 4,686,529
870.31 4,686,530
870.37 4,686,531

CLASS 342

165 4,686,534
195 4,686,532
373 4,686,533

CLASS 343

700 MS 4,686,535
4,686,536
786 4,686,537

CLASS 346

1.1 4,686,538
4,686,539
33 R 4,686,540
108 4,686,541
4,686,542
137 4,686,543
140 R 4,686,544
160 4,686,545

CLASS 350

1.1 4,685,762
96.14 4,685,763
96.20 4,685,764
96.21 4,685,765
96.32 4,685,766
255 4,685,767
320 4,685,768
332 4,685,769
344 4,685,770
347 V 4,685,771
372 4,685,772
401 4,685,773
432 4,685,774
486 4,685,775
502 4,685,776
505 4,685,777
600 4,685,778
604 4,685,779
613 4,685,780

CLASS 351

110 4,685,781
130 4,685,782
163 4,685,783
226 4,685,784

CLASS 353

120 4,685,785

CLASS 354

21 4,685,786
83 4,685,787
121 4,685,788
173.11 4,685,789
203 4,685,790
277 4,685,791

CLASS 355

3 SH 4,685,792
4,685,793
7 4,685,794
8 4,685,795
14 R 4,685,796
14 SH 4,685,797
15 4,685,798

CLASS 356

73.1 4,685,799
152 4,685,800
328 4,685,801
339 4,685,802
361 4,685,803
373 4,685,804
4,685,805
376 4,685,806
401 4,685,807
416 4,685,808

CLASS 357

16 4,686,550
23.4 4,686,551
23.6 4,686,552
23.7 4,686,553
30 4,686,554
4,686,555
4,686,556
34 4,686,557
42 4,686,558
54 4,686,559

CLASS 358

19 4,686,560
31 4,686,561
32 4,686,562
86 4,686,564
101 4,686,565
113 4,686,566
150 4,686,567
4,686,568
167 4,686,569
188 4,686,570
213 4,686,571
213.13 4,686,572
213.22 4,686,573
213.26 4,686,574
240 4,686,575
245 4,686,576
256 4,686,577
280 4,686,578
282 4,686,579
287 4,686,580
294 4,686,581
310 4,686,582
336 4,686,583

CLASS 360

10.3 4,686,584
33.1 4,686,585
38.1 4,686,563
46 4,686,586
74.2 4,686,587
76 4,686,588
77 4,686,589
78 4,686,590
85 4,686,591
97 4,686,592
4,686,593
99 4,686,594
106 4,686,595
126 4,686,596
130.23 4,686,597

CLASS 361

31 4,686,598
32 4,686,599
42 4,686,600
80 4,686,601
91 4,686,602
118 4,686,603
155 4,686,604
231 4,686,605
385 4,686,606
413 4,686,607
428 4,686,608

CLASS 362

61 4,686,609
4,686,610
72 4,686,656
123 4,686,611
297 4,686,612
413 4,686,613

CLASS 363

17 4,686,614
4,686,615
21 4,686,616
56 4,686,617
58 4,686,618
126 4,686,619

CLASS 364

200 4,686,620
4,686,621
4,686,622
300 4,686,623
415 4,686,624
422 4,686,625
426 4,686,626
481 4,686,627
4,686,628
491 4,686,629
492 4,686,630
508 4,686,631
518 4,686,632
523 4,686,633
4,686,634
4,686,635
4,686,636
550 4,686,637
558 4,686,638
559 4,686,639
571 4,686,640
580 4,686,641
607 4,686,642
715 4,686,643
724 4,686,644
754 4,686,645
845 4,686,646
850 4,686,647
862 4,686,648
900 4,686,649

CLASS 365

189 4,686,650
226 4,686,651
230 4,686,652

CLASS 366

101 4,685,809
150 4,685,810
275 4,685,811

CLASS 367

25 4,686,653
41 4,686,654
59 4,686,655
75 4,686,657
85 4,686,658
87 4,686,659
153 4,686,660

CLASS 369

13 4,686,661
44 4,686,662
46 4,686,663
55 4,686,664
77.2 4,686,665
290 4,686,666

CLASS 370

4 4,686,667
15 4,686,668
54 4,686,669
68 4,686,670
88 4,686,671
95 4,686,672
104 4,686,673
112 4,686,674

CLASS 371

8 4,686,675
36 4,686,676
61 4,686,677

CLASS 372

33 4,686,678
48 4,686,679
58 4,686,680
82 4,686,681
87 4,686,682
94 4,686,683
99 4,686,684
107 4,686,685

CLASS 373

22 4,686,687

CLASS 374

132 4,685,812

CLASS 375

11 4,686,686
47 4,686,688
81 4,686,689
114 4,686,690

CLASS 376

230 4,686,077
249 4,686,078
444 4,686,079

CLASS 377

54 4,686,691

CLASS 378

4 4,686,692
120 4,686,694
146 4,686,695

CLASS 379

22 4,686,696
38 4,686,697
53 4,686,698
93 4,686,699
183 4,686,700
211 4,686,701
269 4,686,330
373 4,686,702
410 4,686,703

CLASS 381

73.1 4,686,693

CLASS 382

61 4,686,704

CLASS 384

118 4,685,813

CLASS 400

82 4,685,814
120 4,685,815
157.1 4,685,816
208 4,685,817
249 4,685,818

CLASS 401

176 4,685,819
260 4,685,820

CLASS 402

4 4,685,821

CLASS 403

343 4,685,822
359 4,685,823

CLASS 404

9 4,685,824
65 4,685,825
114 4,685,826

CLASS 405

37 4,685,827
87 4,685,828
124 4,685,829
133 4,685,830
156 4,685,831
184 4,685,832
195 4,685,833
237 4,685,834
263 4,685,835
264 4,685,836
282 4,685,837
284 4,685,838
288 4,685,839

CLASS 406

47 4,685,840
84 4,685,841
106 4,685,842
181 4,685,843

CLASS 407

114 4,685,844

CLASS 409

145 4,685,845

CLASS 410

49 4,685,846

CLASS 411

22 4,685,847
402 4,685,848

CLASS 413

22 4,685,849

CLASS 414

225 4,685,850
361 4,685,851
404 4,685,852
4,685,853
452 4,685,854
482 4,685,855
515 4,685,856
522 4,685,857
537 4,685,858
590 4,685,859
720 4,685,860
729 4,685,861
744 A 4,685,862

CLASS 416

95 4,685,863
229 R 4,685,864

CLASS 417

68 4,685,865
222 4,685,866
367 4,685,867
405 4,685,868
407 4,685,869
500 4,685,870

CLASS 418

206 4,685,871

CLASS 419

8 4,686,080

CLASS 420

29 4,686,081
503 4,686,082
548 4,686,083

CLASS 422

17 4,686,084
45 4,686,085
111 4,686,086
133 4,686,087
135 4,686,088
159 4,686,089
249 4,686,091

CLASS 423

244 4,686,090
306 4,686,092
4,686,093
322 4,686,094
324 4,686,095
447.1 4,686,096
520 4,686,097

CLASS 424

15 4,686,098
47 4,686,099
85 4,686,100
88 4,686,101
92 4,686,102
97 4,686,103
131 4,686,104

CLASS 425

4 R 4,685,872
47 4,686,129
132 4,685,874
136 4,685,875
170 4,685,876
190 4,685,877
202 4,685,878
383 4,685,879
416 4,685,880
562 4,685,881

CLASS 426

74 4,686,105
548 4,686,107
577 4,686,106

CLASS 427

27 4,686,108
36 4,686,109
38 4,686,110
4,686,111
42 4,686,112
45.1 4,686,113
53.1 4,686,114
212 4,686,115
215 4,686,116
249 4,686,117
261 4,686,118
362 4,686,119
370 4,686,120
378 4,686,121
388.3 4,686,122
424 4,686,123

CLASS 428

35 4,686,124
4,686,125
36 4,686,126
40 4,686,127
44 4,686,128
71 4,686,130
158 4,686,131
171 4,686,132
209 4,686,133
222 4,686,134
265 4,686,135
286 4,686,136
290 4,686,137
323 4,686,138
4,686,139
342 4,686,140
344 4,686,141
403 4,686,142
411.1 4,686,143
421 4,686,144
425.9 4,686,145
4,686,146
447 4,686,147
520 4,686,148
522 4,686,149
593 4,686,150
607 4,686,151
4,686,152
610 4,686,153
611 4,686,154
652 B1 4,004,892
653 4,686,155
698 4,686,156

CLASS 429

19 4,686,157
26 4,686,158
39 4,686,159
50 4,686,160
4,686,161

CLASS 430

5 4,686,162
47 4,686,163
63 4,686,164
69 4,686,165
109 4,686,166
190 4,686,280
244 4,686,170
264 4,686,167
273 4,686,171
286 4,686,172
313 4,686,173
326 4,686,168
339 4,686,169
502 4,686,174
505 4,686,175
506 4,686,176
553 4,686,177
569 4,686,178

CLASS 431

182 4,685,882

CLASS 433

215 4,685,883

CLASS 434

152 4,685,884
164 4,685,885

CLASS 435

7 4,686,179
4,686,180
4,686,181
24 4,686,182
158 4,686,183
172.3 4,686,184
206 4,686,185
243 4,686,186
275 4,686,187
287 4,686,188
289 4,686,189
291 4,686,190
320 4,686,191

CLASS 436

60 4,686,192
536 4,686,193
4,686,194

CLASS 437

41 4,685,194
4,685,195
4,685,196

54 4,685,199
73 4,685,198
81 4,685,979
173 4,685,976
195 4,685,197
215 4,685,200

CLASS 439

55 4,685,886
74 4,685,753
96 4,685,752
188 4,685,887
270 4,685,754
404 4,685,755
426 4,685,756
4,685,757
606 4,685,758
822 4,685,760
843 4,685,761

CLASS 440

53 4,685,888
69 4,685,889

CLASS 441

94 4,685,890

CLASS 445

36 4,685,891

CLASS 446

109 4,685,892
319 4,685,893
435 4,685,894

CLASS 455

109 4,686,705
186 4,686,706
200 4,686,707
280 4,686,708
613 4,686,709

CLASS 464

19 4,685,895
68 4,685,896
141 4,685,897

CLASS 474

149 4,685,898

CLASS 494

44 4,685,899

CLASS 501

12 4,686,195
13 4,686,196

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